CSD Environmental Services, Inc.

CHEMETCO, INC.
REVISED SAMPLING AND ANALYSIS PLAN FOR ZINC OXIDE SPILL AREA

Prepared by:

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Revised ~~2-28-98~~
January 19, 2000

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FIGURES

ATTACHMENTS

CHEMETCO, INC.
SOIL SAMPLING AND ANALYSIS PLAN
FOR ZINC OXIDE SPILL AREA
~~***Revised 2-28-98***~~
Revised January 19, 2000

1.0 INTRODUCTION

Chemetco, Inc. (Chemetco) is a secondary copper smelter located at the intersection of Route 3 and Oldenberg Road in Hartford, IL. Chemetco was constructed in 1969 and began producing anode copper, cathode copper, crude lead-tin solder, zinc oxide and slag in 1970. The facility is located in an agricultural, light residential area south of Hartford, IL, about one mile east of the confluence of the Missouri and the Mississippi Rivers. On September 17, 1996 during a routine RCRA Inspection, the Illinois Environmental Protection Agency (IEPA) and Chemetco discovered a spill of zinc oxide material from an abandoned pipe south of Oldenberg Road. The spill was found to have entered Long Lake at the southern portion of the plant property. The spill was contained on Chemetco's property. This Sampling and Analysis Plan was compiled to determine the appropriate sampling parameters and locations of the spilled zinc oxide material. This plan was further revised on February 28, 1998, to reflect comments made by the IEPA on February 13, 1998. A map indicating the location of the spilled zinc oxide is provided as Figure 1. This plan is currently being revised to reflect the Illinois EPA's conditions contained in the June 10, 1998, approval letter and the results of recent negotiations between the Illinois EPA and Chemetco.

2.0 SAMPLING AND ANALYSIS

2.1 Objectives

This Sampling and Analysis Plan (SAP) describes the activities associated with determining location of, and collection method for, samples to determine the levels of waste constituents which are proposed to remain in the soil.

2.2 Sampling Team Responsibilities

Responsibilities of the Sampling Team are described below:

2.2.1 Sampling Team Leader

The Sampling Team Leader (STL) will be responsible for conducting the sampling program, assuring the availability and maintenance of all sampling equipment and materials, and providing for shipping and packing materials. The STL will supervise and be responsible for the completion of all chain-of-custody records, proper handling and shipping of the samples collected, and the accurate completion of field log books. The STL will be present on-site whenever samples are collected. The STL may also be a member of the sampling team.

2.2.2 Sampling Team Member(s)

The sampling team member(s) (STM) will collect samples, transfer them for shipping, and decontaminate sampling equipment as directed by the STL.

2.3 Sampling Summary

Soil samples will be collected from a grid interval and the sampling depths described in Section 3.2.

Soil samples will be analyzed using USEPA SW-846 method 9045 for pH, TCLP method 6010A for lead, cadmium and zinc. These analytical parameters were selected based on knowledge of the types of waste streams stored in these areas. ~~The data will be evaluated in accordance with Section 5.0 of this plan.~~ Soil samples will be classified in accordance with ASTM Method D-2488.

3.0 SITE CHARACTERIZATION AND SAMPLING PROCEDURES

The following subsections present the procedures to be followed for site activities related to field surveys and sampling efforts.

3.1 Site Preparation for Soil Sampling

Prior to collecting soil samples from Long Lake, the visible zinc oxide will be removed by a trackhoe and placed into a Containment Area labeled Containment #1 for temporary storage. Refer to Figure 1 for the location of the containment areas.

The sampling grid will be laid out over the Spill Area. Construction grade stakes with the sample identification noted will be placed at the sample locations.

3.2 Soil Sampling Procedures

3.2.1 Soil Sample Locations

The location of the soil sampling points are to be based upon the following equation:

$GI = (A/\pi)^{0.5}/2$

where: A = area to be gridded in feet^2, and GI = grid interval (feet)

Samples will be collected where the grid lines cross. Figures 2 and 3 are maps of the approximate sample locations. The soil samples will be collected using a hand auger. Samples will be collected at two intervals, 6 inches and 18 inches in depth.

<u>Containment Areas 1, 2, & 4</u>

The calculated area for containment areas 1, 2, and 4 equals 161,000 feet^2, resulting in a grid interval of 113'. For ease in staking a grid interval of 100 feet was used.

<u>Containment Area #3</u>

The calculated size of Containment Area #3 equals 35,000 feet^2, resulting in a grid interval of 50'.

<u>Rock Road</u>

Samples will be collected from beneath the rock road. A grid interval of 100' was used to determine sample locations. In the area of visual contamination the grid interval was decreased to 50 feet.

<u>Ditch</u>

Samples will be collected from the ditch south of Oldenburg Road to the spill area. A conservative grid interval of 50' was chosen for this location.

3.2.2 Additional Soil Sample Locations

Long Lake

The IEPA on February 13, 1998, requested Chemetco collect additional samples in Long Lake near the release area. Six additional sediment samples will be collected from the tributary to Long Lake. No grid interval was used to determine sample locations. Refer to Figure 4 for sample locations. The IEPA requested in the June 10, 1998 closure plan approval letter, two additional sediment samples from Long Lake. Refer to Figure 4 for the location of thee samples also.

Perimeter Sampling

The IEPA on February 13, 1998, requested Chemetco collect additional samples along the perimeter of the spill area and of sediment in Long Lake. Thirteen additional samples are proposed in response to this request. The additional soil sample locations are provided in Figure 2. A soil sample is not proposed south of Containment Area #4 and the tributary to Long Lake due to inaccessibility of this area. The area south is heavy vegetated and moist, allowing little to no access to the area. In lieu of collecting a sample in this area, Chemetco proposes the IEPA allow samples RR-1; RR-2; and RR-3 collected from soil beneath the rock road suffice for sampling this area. Soil sample locations to the east of the spill area are limited by the presence of the gravel roadway. Any spilled material would have been confined to the west of the gravel roadway since the roadway is of higher elevation than the spill area. Sample locations were limited to the west side of the roadway.

Ditch

The IEPA on February 13, 1998, requested Chemetco collect additional samples along the ditch leading to the release area in Long Lake. Six additional sediment samples will be collected. No grid interval was used to determine sample locations. Refer to Figure 3 for sample location.

3.2.3 Soil Sampling Methods

The soil will be sampled using the following procedures:

1. A decontaminated stainless steel five foot long split spoon sampler will be pushed to the appropriate depth to obtain a representative sample;

2. The sample will be removed from the auger in the field and placed in a laboratory provided glass jar for shipping; and

3. The samples will be transported to the laboratory within 24 hours of sample collection.

The split spoon and any other equipment used will be decontaminated in accordance with the procedures discussed in Section 3.8.

The following procedures will be utilized in the collection of all required soil samples:

a. The procedures used to collect soil samples must be sufficient so that all soil encountered is classified in accordance with ASTM Method D-2488.
b. If a drill rig or similar piece of equipment is necessary to collect required soil samples, then:

    1. The procedures specified in ASTM Method D-1586 (Split Spoon Sampling) or D-1587 (Shelby Tube Sampling) must be used in collecting the samples.

    2. Soil samples must be collected continuously at several locations to provide information regarding the shallow geology of the area where the investigation is being conducted;

c. All soil samples which will be analyzed for volatile organic compounds must be collected in accordance with Attachment A of the Illinois EPA's RCRA closure plan instructions;

d. All other soil samples must be collected in accordance with the procedures set forth in Test Methods for Evaluating Solid Wastes (SW-846), Third Edition and Finalized Updates;

e. When visually discolored or contaminated material exists within an area to be sampled, horizontal placement of sampling locations shall be adjusted to include visually discolored and/or contaminated areas. Sample size per interval shall be minimized to prevent dilution of contamination.

Quality assurance/quality control procedures which meet the requirements of SW-846 shall be implemented during all required sampling/analysis efforts.

3.2.4 Sediment Sampling Methods

Sediment samples will be collected using the following procedures:

1. A decontaminated sediment sampler will be used to collect the sediment samples.

2. If using the sampler from a boat, attach a rope to the plunger eyebolt. A second rope is attached to the hammer eyebolt, for purposes of raising and lowering the hammer itself. A third rope should be attached to one of the eyebolts on the stainless steel tune for purposes of a "safety" line.

3. Lower the sampler slowly by using the plunger rope until the sampler tube touches the bottom and the sampler is in a vertical position.

4. Mark the plunger rope at the point where it touches the water surface.

5. With one person holding the plunger rope, keeping the sampler as vertical as possible, the second person uses the hammer rope to begin driving the sampler into the lake bottom. (The rope on the stainless steel tube can be tied to the boat.) The hammer rope is

then used to raise the hammer upward along the plunger. The hammer is dropped by a free fall on top of the stainless steel tube, thereby driving the sampler into the lake bottom.

6. This is repeated until the sampler's downward progress with each free fall of the hammer is minimal. The depth of the core sample can be estimated by use of the mark on the plunger rope.

7. When the desired depth has been reached, the sampler is then "pounded" out with the hammer by upward pulls of the hammer rope.

8. Once the sample has been collected, the plunger is used to remove the plastic liner which contains the core sample from inside the stainless steel tube.

9. Samples shall remain in the plastic liner or container until laboratory analyses can be performed.

10. The samples will be transported to the laboratory within 24 hours of sample collection.

Any equipment used will be decontaminated in accordance with the procedures discussed in Section 3.8.

3.3 Analytical Program

All samples sent for chemical analysis will be analyzed using SW-846 methods by Prairie Analytical Systems, Inc. located in Springfield, IL. Samples taken to demonstrate closure shall achieve the practical quantitation limit (PQL) identified in SW-846 (Third Edition) for the constituents of waste managed in the unit.

Chemetco proposes to analyze the samples collected for Total and TCLP arsenic, barium, cadmium, chromium, lead, mercury, nickel, selenium, silver and zinc pursuant to the IEPA's approval letter dated June 10, 1999. ~~lead, cadmium and zinc.~~ The chemical analysis data provided in the MSDS sheet lists zinc oxide as containing the following: nickel at 0.2-0.3%; copper 4-6%;

zinc 30-40%, iron 1.3-1.9%, cadmium 0.25-0.30%; calcium 0.8 - 1.5%; sodium 0.5 - 1.0%; silver 0.010-0.020%; lead 15-20%, silica 4-6%, chloride 1.5 - 2% and tin at 2.5%. Based upon the MSDS data, the major constituents of zinc oxide are zinc and lead. A copy of the MSDS sheets is provided in Attachment 3 to this sampling and analysis plan.

A limited organic/inorganic scan was conducted by Prairie Analytical on the zinc oxide. No organics were detected in the limited scan. Refer to Table 1 for a summary of the data collected. [redacted]

Samples were collected by the IEPA for total and TCLP metal analysis of the RCRA 8 metals. The TCLP results indicate the samples failed for cadmium and lead. The remaining metals were all below hazardous regulatory guidelines. In addition, the remaining metals concentrations in the raw zinc oxide were compared to the Tier 1 clean up objectives for migration to Class I groundwater in IAC, Part 742, Appendix B, Table B. All the metals except for cadmium and lead were below the Tier 1 objectives. Chemetco concludes if the metal content within the raw zinc oxide is below the Tier 1 objectives, the soil impacted from the spill must also be below the Tier 1 objectives, unless it is affected by natural background conditions. Refer to Table 2 for a summary of the data collected.

Table 1
TCLP Analysis - Zinc Oxide
Chemetco, Inc.

Parameters	Detection Limit	Result mg/l	Reg. Limit mg/l
Benzene	0.20	<0.20	0.500
Carbon Tetrachloride	0.012	<0.012	0.500
Chlorobenzene	0.020	<0.020	100.0
Chloroform	0.005	<0.005	6.00
O-Cresol	0.010	<0.010	200.0
M-Cresol	0.010	<0.010	200.0
P-Cresol	0.010	<0.010	200.0
Total Cresols	0.010	<0.010	200.0
1,4 - Dichlorobenzene	0.010	<0.010	7.50
1,2 - Dicholoroethane	0.003	<0.003	0.50
1,1- Dichloroethlylene	0.013	<0.013	0.70
2,4 - Dinitrotoluene	0.010	<0.010	0.13
Hexachlorobenzene	0.010	<0.010	0.13
Hexachlorobutadiene	0.010	<0.010	0.50
Hexachloroethane	0.010	<0.010	3.00
Methl Ethyl Ketone	0.020	<0.020	200.00
Nitrobenzene	0.010	<0.010	2.00
Pentachlorophenol	0.050	<0.050	100.00
Pyridine	0.010	<0.010	5.00
Tetrachloroethylene	0.003	<0.003	0.70
Trichloroethlylene	0.012	<0.012	0.50
2,4,5 - Trichlorophenol	0.010	<0.010	400.00
2,4,6-Trichlorophenol	0.010	<0.010	2.00
Vinyl chloride	0.018	<1.0	0.20
Cyanide, Total	1.0	<1.0	250.0

Parameters	Detection Limit	Result mg/l	Reg. Limit mg/l
Sulfide, Total	1.0	<1.0	500.00
Phenolics, Total	1.0	<1.0	1000.00
EOX	10.0	<10.0	1000.00
pH		7.0	2.0<ph<12.5
Flashpoint		<200	<140
Paint Filter		Pass	No free liquids
% solids		83.5%	

Table 2
TCLP Results in mg/l
IEPA sampling 9/19/96

Parameter Location	X101	X102	X103	Tier 1 Migration to Groundwater	TCLP Regulatory Number
Arsenic	0.025	0.025	0.025	0.05	5.0
Barium	0.143	0.127	0.108	2.0	100.0
Cadmium	11.4	11.2	11.5	0.005	1.0
Chromium	0.005	0.005	0.005	0.1	5.0
Lead	79.3	61.9	36.3	0.0075	5.0
Mercury	0.0002	0.00022	0.00025	0.002	0.2
Selenium	0.050	0.050	0.050	0.05	1.0
Silver	0.005	0.005	0.005	0.05	5.0

[1]Objective established using 35 IAC Part 742, Appendix B, Table C - pH Specific Soil Remediation Objectives for Inorganics for the Soil Component of the Groundwater Ingestion Route (Class I). [2]A preliminary remediation goal of 400 mg/kg has been set for lead based on *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities*, OSWER Directive #9355.4-12. Risk Based Objectives are proposed for comparison purposes only. Clean up objectives to be proposed by CSD Environmental Services by June 30, 1998.

3.4 Sampling Methodologies

Before beginning to sample the site, the STL will become acquainted with the site features and the planned boring locations. Any movable structures will be cleared away from each location, if necessary. Equipment will be decontaminated prior to each new soil boring, following procedures included in Section 3.8.

3.5 Documentation

Sample collection will take place in the presence of a geologist. The geologist will log all borings and, at a minimum, will note the following:

- sample identification;
- date(s);
- sampling equipment used;
- sample depths;
- sample recovery;
- sample description; and
- remarks.

3.6 Sample Numbering System and Labeling

A sample numbering system will be used to allow tracking, retrieval, cross referencing of sample information and positive identification. Each sample submitted for chemical analysis will be assigned a unique sample identification number. The samples will be numbered as identified below.

1. For samples collected from Containment Area #1 the following number system shall be used:

   CA-1 1 - 6"
   CA-1 1 - 18"

   CA-1 will identify the sample as being derived from containment area #1, with the numerical designation identifying the sample order and the depth at which the sample was collected.

2. For samples collected from Containment Area #2 the following number system shall be used:

   CA-2 1 - 6"
   CA-2 1 - 18"

   CA-2 will identify the sample as being derived from containment area #2, with the numerical designation identifying the sample order and the depth at which the sample was collected.

3. For samples collected from Long Lake - Containment Area #3, the following number system shall be used:

   CA-3 1 - 6"
   CA-3 1 - 18"

   CA-3 will identify the sample as being derived from Long Lake, with the numerical designation identifying the sample order and finally the depth at which the sample was collected.

4. For samples collected from Containment Area #4 the following number system shall be used:

   CA-4 1 - 6"
   CA-4 1 - 18"

   CA-4 will identify the sample as being derived from containment area #4, with the numerical designation identifying the sample order and the depth at which the sample was collected.

5. For samples collected from Long Lake outside the containment areas, the following number system shall be used:

   LL-1 - 6"
   LL-1 - 18"

LL-1 will identify the sample as being derived from Long Lake outside the containment areas, with the numerical designation identifying the sample order and the depth at which the sample was collected.

6. For samples collected around the perimeter of the containment areas, the following number system shall be used:

   P-1 - 6"
   P-1 - 18"

7. For samples collected along the ditch north of and adjacent to containment area #1, the following number system shall be used:

   D-1 - 6"
   D-1 - 18"

   D-1 will identify the sample as being along the ditch north of and adjacent to containment area #1, with the numerical designation identifying the sample order and the depth at which the sample was collected.

3.6.1 Labeling

Sample labels will be affixed to each sample at the time of collection. The label will include the following information as a minimum:

- Sample identification number;
- Date sampled;
- Time sampled; and
- Person sampling.

In addition, each person involved in the sampling activity will record the above information, as well as comments regarding sampling, in a field log book and on the chain of custody form.

3.7 Sample Shipment

Each sample will be placed into individual laboratory provided glass jars.

Samples will be placed carefully in coolers for storage and shipment. Since only metal analysis is being proposed, the samples need not be kept cool on ice. Each cooler will be provided with a chain-of-custody form. Attachment 1 illustrates a typical chain-of-custody form.

All environmental samples for analytical testing will be hand delivered or shipped overnight to Prairie Analytical within 24 hours after sampling to allow completion of analyses within the specified holding times.

3.8 Decontamination Procedures

In order to minimize the potential for cross-contamination between borings, equipment which may come in contact with the sample media will be decontaminated before sampling. In addition, all equipment will be decontaminated between samples. All rinse waters used for decontamination will be captured and containerized into 55 gallon drums. The rinse waters will be transported to the AAF scrubber ponds or Containment Area #2 for disposal.

Reusable non-dedicated equipment (hand auger, split spoons, scoops, etc.) will be decontaminated between each sample and before removal from the site. The decontamination procedures for all sampling equipment will be as follows:

1. Soap wash (Alconox or equivalent) in hot water solution;
2. Potable water rinse;
3. Potable water rinse; and
4. Air Dry.

The equipment used to assist in the collection of samples will be decontaminated prior to and immediately after completion of the project. The equipment will be decontaminated using a high pressure hot water wash. A decontamination pad will be constructed of plastic sheeting and lumber. All rinse waters will be collected and transferred into a temporary tank by a portable pump. The rinse water will be transferred to the polish pits or Containment Area #2 for disposal.

3.9 Miscellaneous

3.9.1 Quality Assurance/Quality Control

Quality Assurance/Quality Control samples will include a field blank. The field equipment rinse blank sample will be collected by pouring laboratory-provided distilled/deionized water over a decontaminated split spoon or hand auger. The field blank will be analyzed for lead, cadmium and zinc. A copy of the laboratory's QA/QC's procedures are provided as Attachment 45 .

3.9.2 Personnel Safety and Fire Prevention

Clean up operations will be conducted by personnel who have received 40 hours of health and safety training in compliance with OSHA, 29 CFR 1910.120(E). All managers and supervisors present have received an additional eight hours of specialized training on managing hazardous waste operations.

4.0 SITE INVESTIGATION REPORT

Following receipt of final analytical results, a final closure report will be prepared summarizing the methods and results of the investigation. The report will contain information as outlined below:

- An area map will be prepared showing the general site location.
- Field and laboratory methods will be outlined and laboratory analytical results will be reported.
- The nature and extent of any subsurface contaminants detected during the investigation will be summarized.

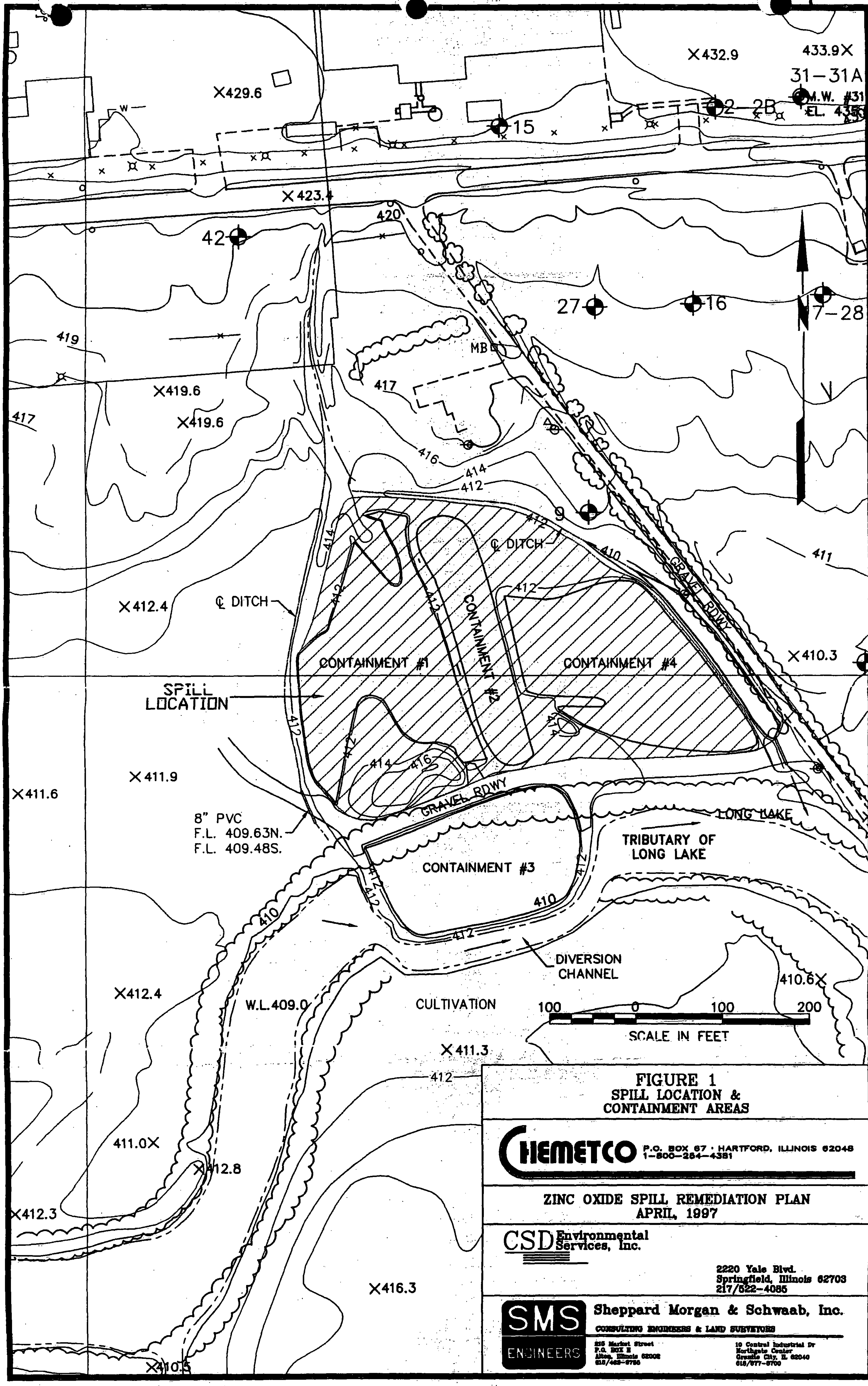
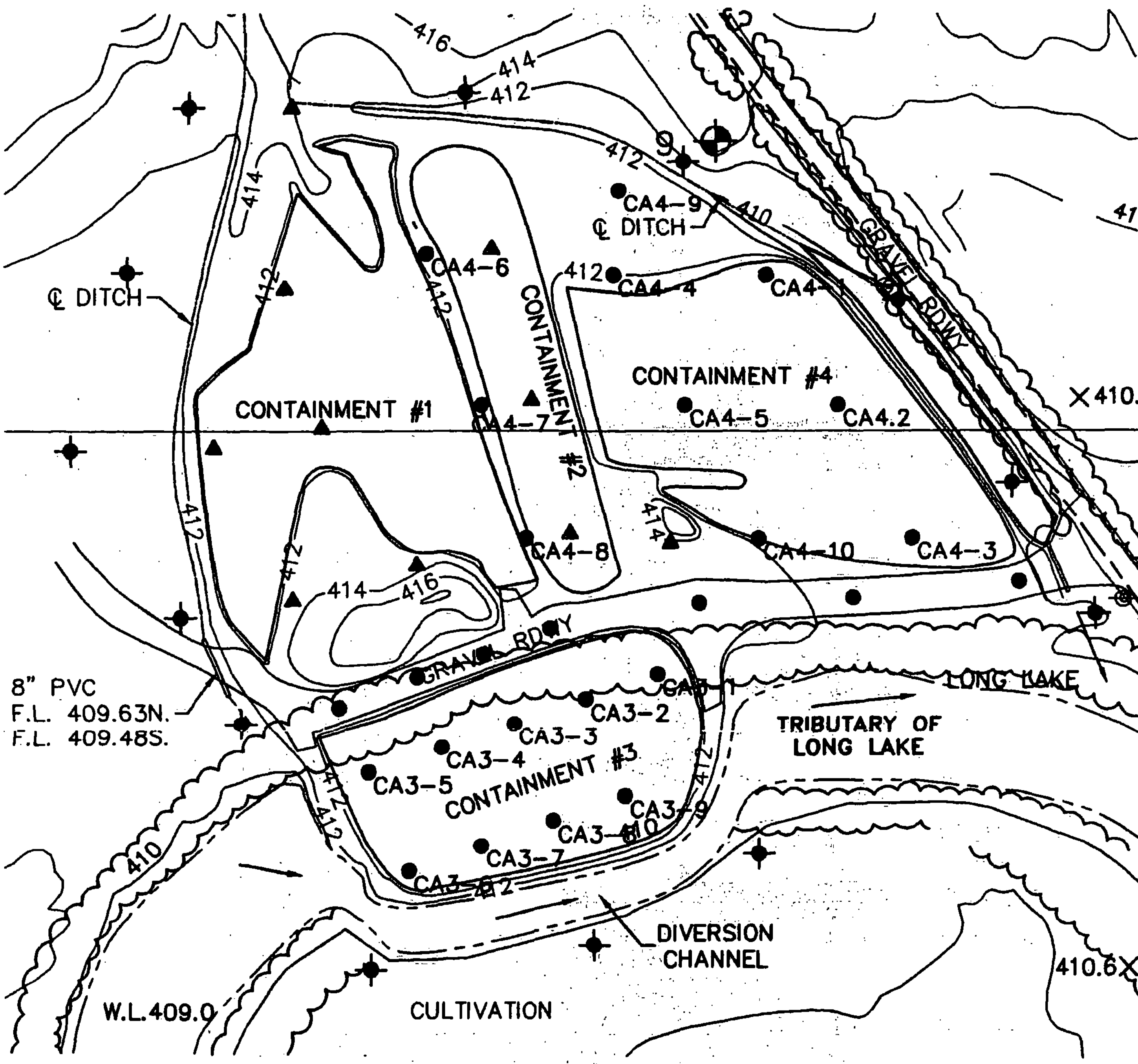


FIGURE 1
SPILL LOCATION &
CONTAINMENT AREAS



LEGEND

- ● SAMPLES COLLECTED
- ▲ SAMPLES TO BE COLLECTED AFTER ADDITIONAL REMEDIATION
- ✦ PERIMETER SAMPLES

N

100 0 100 200

SCALE IN FEET

FIGURE 2
SAMPLE LOCATIONS

CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048
1-800-254-4381

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997

CSD Environmental Services, Inc.

2220 Yale Blvd.
Springfield, Illinois 62703
217/522-4085

SMS ENGINEERS **Sheppard Morgan & Schwaab, Inc.**
CONSULTING ENGINEERS & LAND SURVEYORS

215 Market Street
P.O. BOX E
Alton, Illinois 62002
618/462-9756

10 Central Industrial Dr
Northgate Center
Granite City, IL 62040
618/877-8700

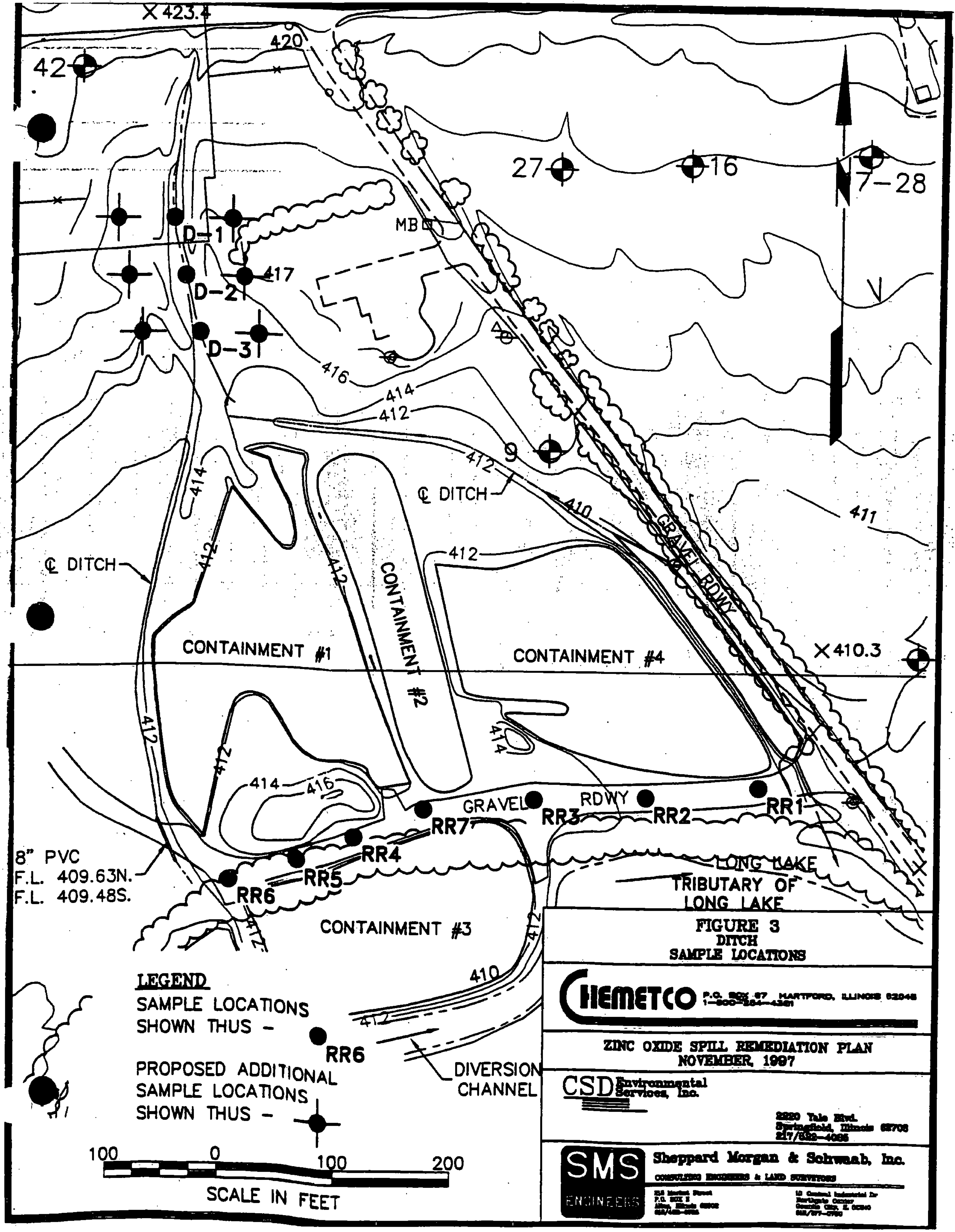


FIGURE 3
DITCH
SAMPLE LOCATIONS
CHEMETCO
ZINC OXIDE SPILL REMEDIATION PLAN
NOVEMBER, 1997
CSD Environmental Services, Inc.
2220 Yale Blvd.
Springfield, Illinois
SMS ENGINEERS
Sheppard Morgan & Schwaab, Inc.
CONSULTING ENGINEERS & LAND SURVEYORS
LEGEND
SAMPLE LOCATIONS SHOWN THUS -
RR6
PROPOSED ADDITIONAL SAMPLE LOCATIONS SHOWN THUS -
100 0 100 200
SCALE IN FEET
CONTAINMENT #1
CONTAINMENT #2
CONTAINMENT #3
CONTAINMENT #4
℄ DITCH
GRAVEL RDWY
LONG LAKE
TRIBUTARY OF LONG LAKE
DIVERSION CHANNEL
8" PVC
F.L. 409.63N.
F.L. 409.48S.
D-1
D-2
D-3
RR1
RR2
RR3
RR4
RR5
RR6
RR7
MB
423.4
410.3
42
27
16
7-28
9
420
417
416
414
412
411
410

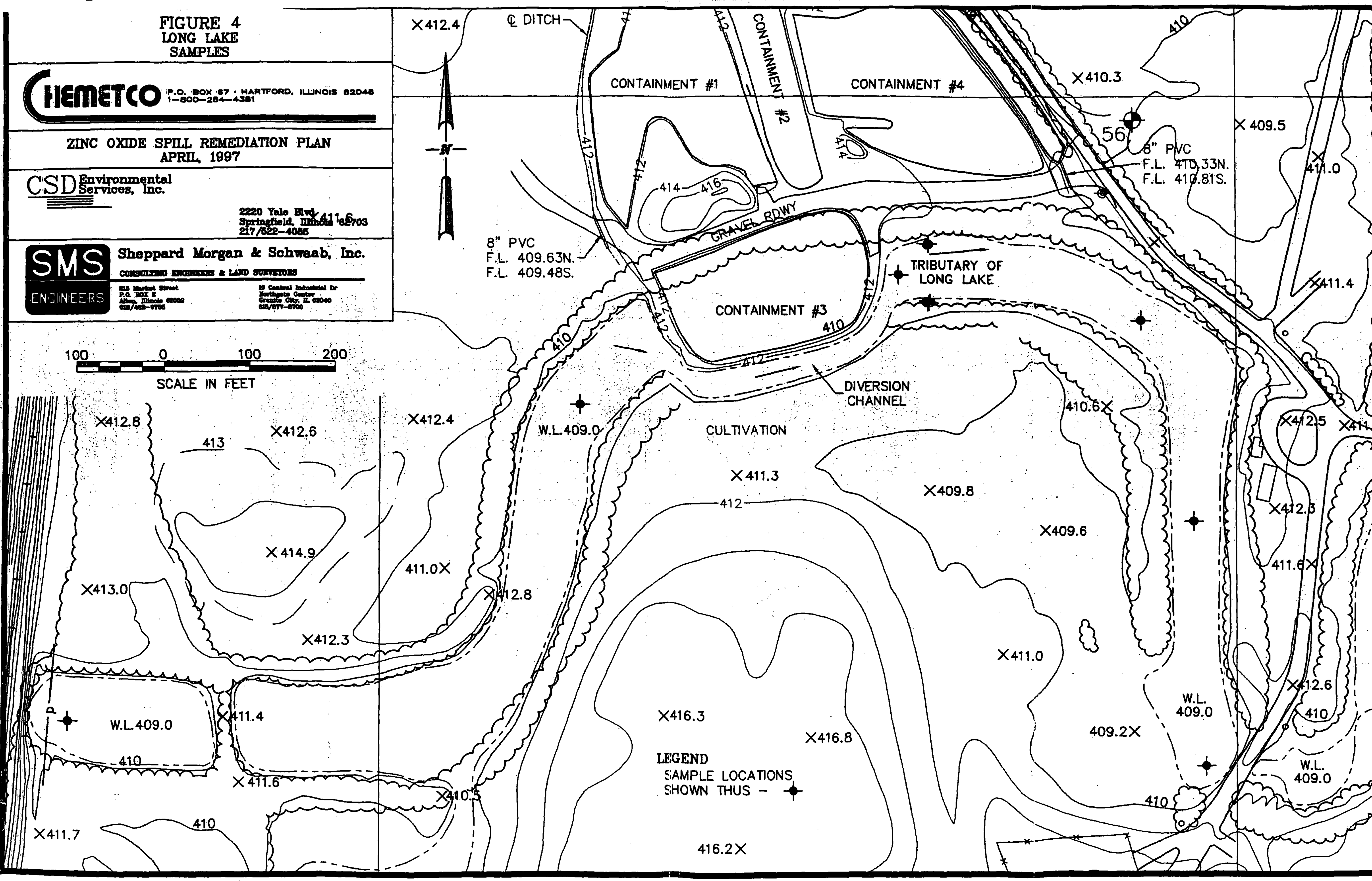
FIGURE 4
LONG LAKE SAMPLES

CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048
1-800-254-4381

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997

CSD Environmental Services, Inc.
2220 Yale Blvd
Springfield, Illinois 62703
217/522-4085

SMS ENGINEERS
Sheppard Morgan & Schwaab, Inc.
CONSULTING ENGINEERS & LAND SURVEYORS
215 Market Street
P.O. BOX K
Alton, Illinois 62002
618/462-9755
19 Central Industrial Dr
Northgate Center
Granite City, IL 62040
618/877-8700



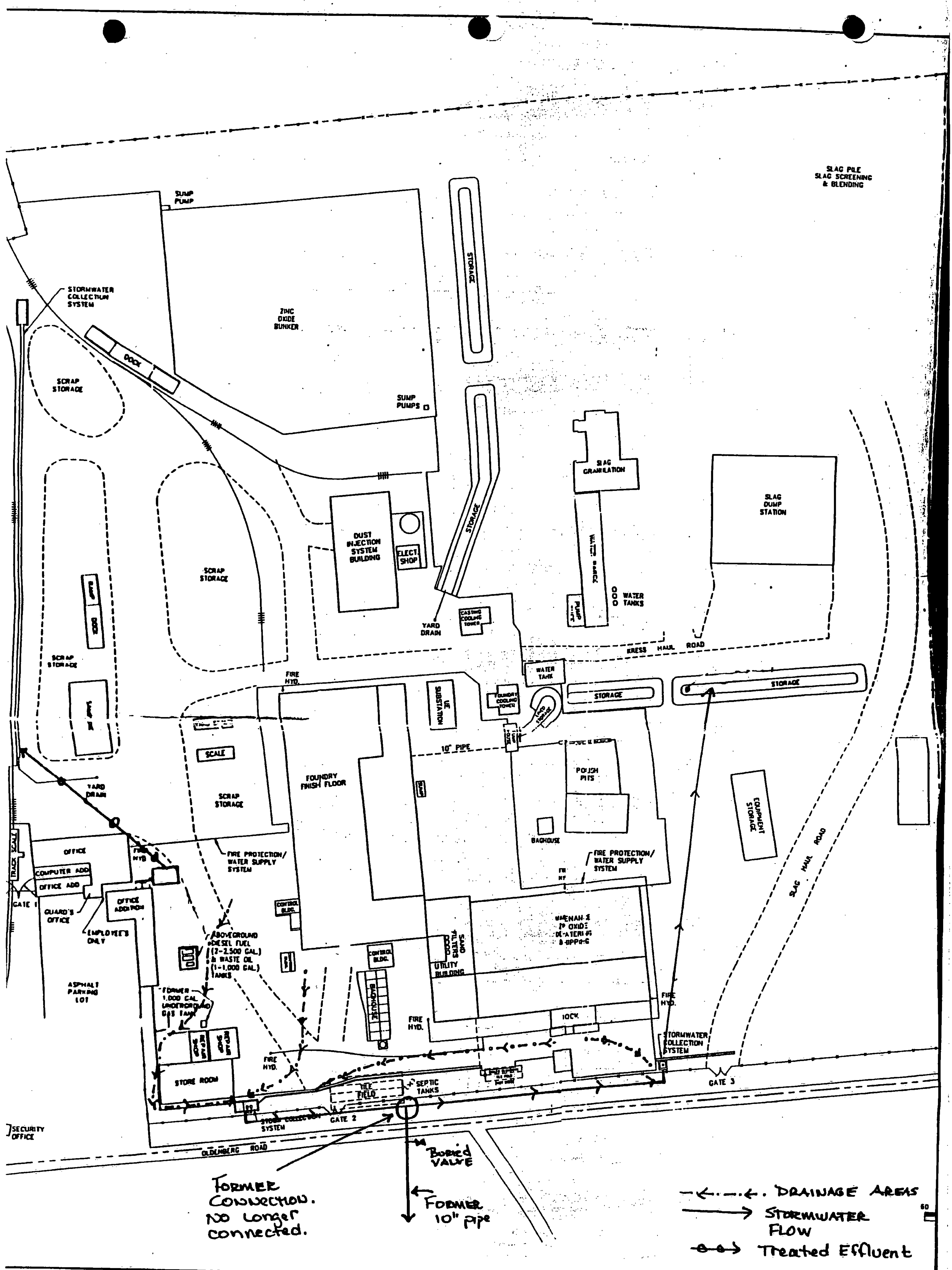


FIGURE 5:
STORMWATER
Piping.

ATTACHMENT 1
Chain of Custody

Chain of C y Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client		Project	
Address		Contact Person	
City, State, Zip		P. O. #/ Invoice to:	
Phone Number		Facsimile Number	

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling		Container		Preser-vative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			

Relinquished by:		Received by:	
Date:	Time:	Date:	Time:
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: ____________

Form PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Smapler

ATTACHMENT 2
Analytical Results - Zinc Oxide

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

2009 Mall Street, Collinsville, IL 62234

618/346-5120

October 29, 1996

John G. Cotter, Environmental Coordinator
Chemetco, Inc.
P.O. Box 67
Hartford, Illinois 62048

Re: 1198010003 - Madison County
Chemetco, Inc.
ILD0048843809
FOS File

Dear Mr. Cotter:

Attached are the results of the sampling the Agency conducted at your facility on September 18, 1996.

If you should have any questions concerning these results, please contact me at 618/346-5120.

Sincerely,

ENVIRONMENTAL PROTECTION AGENCY

Chris N. Cahnovsky

Chris N. Cahnovsky, CHMM
Bureau of Land

CNC:cas
Attachments

U.S. EPA - CLP TOTAL

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO: X101

Lab Name: ARDL, INC. Contract No.: 2424

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: X101

Matrix (soil/water) SOIL Lab Sample ID: 2424-1

Level (low/med): LOW Date Received: 09/19/96

% Solids: 72.4

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	35.1			P
7440-39-3	Barium	1350			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	940			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	163		N	P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	30000		E	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	3.2			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	4.0	B	N E	F
7440-22-4	Silver	51.7			P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: SMALL ROCKS

U.S. EPA - CLP TCLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

X101

Lab Name: ARDL, INC. Contract No.: 2424

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: X101

Matrix (soil/water) TCLP Lab Sample ID: 2424-1

Level (low/med): LOW Date Received: 09/19/96

% Solids: 0.0

Concentration Units: (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	25.0	U		P
7440-39-3	Barium	143	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	11400		E	P
7440-70-2	Calcium				NR
7440-47-3	Chromium	5.0	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	79300		E	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	50.0	U		P
7440-22-4	Silver	5.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: X102

Lab Name: ARDL, INC. Contract No.: 2424

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: X101

Matrix (soil/water) SOIL Lab Sample ID: 2424-2

Level (low/med): LOW Date Received: 09/19/96

% Solids: 53.8

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	98.0			P
7440-39-3	Barium	2250			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	1810			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	156		N	P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	53400		E	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	9.7			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	4.4	B	N E	F
7440-22-4	Silver	122			P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: SMALL ROCKS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

X102

Lab Name: ARDL, INC.   Contract No.: 2424

Lab Code: ARDL   Case No.:   SAS No.:   SDG No.: X101

Matrix (soil/water) TCLP   Lab Sample ID: 2424-2

Level (low/med): LOW   Date Received: 09/19/96

% Solids: 0.0

Concentration Units: (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	25.0	U		P
7440-39-3	Barium	127	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	11200		E	P
7440-70-2	Calcium				NR
7440-47-3	Chromium	5.0	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	61900		E	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.22			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	50.0	U		P
7440-22-4	Silver	5.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: COLORLESS   Clarity Before: CLEAR   Texture:

Color After: COLORLESS   Clarity After: CLEAR   Artifacts:

Comments:

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

X103

Lab Name: ARDL, INC. Contract No.: 2424

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: X101

Matrix (soil/water) SOIL Lab Sample ID: 2424-3

Level (low/med): LOW Date Received: 09/19/96

% Solids: 54.3

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	89.8			P
7440-39-3	Barium	2570			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	2960			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	77.5		N	P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	72800		E	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	8.7			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	1.8	B	N E	F
7440-22-4	Silver	86.2			P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: SMALL ROCKS

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

X103

Lab Name: ARDL, INC. Contract No.: 2424

Lab Code: ARDL Case No.: SAS No.: SDG No.: X101

Matrix (soil/water) TCLP Lab Sample ID: 2424-3

Level (low/med): LOW Date Received: 09/19/96

% Solids: 0.0

Concentration Units: (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	25.0	U		P
7440-39-3	Barium	108	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	11500		E	P
7440-70-2	Calcium				NR
7440-47-3	Chromium	5.0	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	36300		E	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.25			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	50.0	U		P
7440-22-4	Silver	5.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Chain of C[illegible]dy Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD Environmental	Project	Chemetco
Address	2020 Yale Blvd	Contact Person	Cindy Davis
City, State, Zip	Springfield, IL 62703	P. O. #/ Invoice to:	Chemetco
Phone Number	217/522-4085	Facsimile Number	217/522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling Date	Sampling Time	Container Size	Container No.	Preser-vative	Analysis Requested	PAS Sample Number
[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]	[redacted]	[redacted]
Zincoxide	soil	7/23/97	2:30		2	none	Flash, % solids, paint filter, total & reactive cyanides*, total & reactive sulfides* total phenol, E.O.X., volatiles → see attached, BASE NUETRALS (see attached)	4140

Relinquished by: Marc Summers		Received by: Scott A Re[illegible]	
Date: 7/23/97	Time: 3:35 P.M.	Date: 7-23-97	Time: 1535 hrs
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-184

Form PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Smapler

Analytical Requirements

I. pH
   Flashpoint (>200)
   % Solids
   Paint Filter
   Bulk Density
   * Total and Reactive Cyanides
   * Total and Reactive Sulfides
   Total Phenol
   Extractable Organic Halogen (E.O.X.)

* Reactives only need to be run if totals are >10 ppm.

II. Total and TCLP Metals (TCLP's require matrix spike confirmation):

Arsenic	Total Metals required if the % solids is greater than 90%.
Barium	
Cadmium	
Chromium	IF HAZARDOUS FOR METALS, PDC IS REQUIRED
Lead	TO RUN A TREATABILITY STUDY TO DEMONSTRATE
Mercury	COMPLIANCE WITH LDR'S
Selenium	
Silver	

III. TCLP BNA's & TCLP VOA's
(i.e. D018-D043 Matrix spike confirmation required)

VOLATILES:
EPA Method 8260

Vinyl Chloride ✓
1,1-Dichloroethene ✓
Chloroform ✓
1,2-Dichloroethane ✓
Carbon Tetrachloride ✓
Trichloroethene ✓
Benzene ✓
Tetrachloroethene ✓
Chlorobenzene ✓
1,4-Dichlorobenzene ✓
2-Butanone (MEK) ✓

BASE/NEUTRAL/ACID EXTRACTABLES:
EPA Method 8270

Base/Neutrals
Pyridine ✓
Hexachloroethane ✓
Nitrobenzene ✓
Hexachlorobutadiene ✓
2,4-Dinitrotoluene ✓
Hexachlorobenzene ✓

Acids
m,p-Cresol ✓
o-cresol ✓
2,4,6-Trichlorophenol ✓
2,4,5-Trichlorophenol ✓
Pentachlorophenol ✓

****

IF THE WASTE CARRIES ANY HAZARDOUS WASTE CODES (SUCH AS F001, F019, ETC...) THE WASTE MUST BE ANALYZED FOR ANY BDAT STANDARDS LISTED FOR THAT HAZARDOUS WASTE CODE

****

MUST BE ON SIGNED LABORATORY LETTERHEAD

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD EnvironmentalServices, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 22 July 1997
Date Received: 23 July 1997
Date Analyzed 25 July 1997
Date Reported: 28 July 1997

Project: Chemetco

PAS Project Code: CSD-184

Sample Description: Zinc Oxide

PAS Sample No.: 9707234140

TCLP Organic Analysis

Parameters	Detection Limit mg/l	Result mg/l	E.P.A. Method	STORET Number	Regulatory Limit mg/l
Benzene	0.020	<0.020	8260A	99128	0.500
Carbon Tetrachloride	0.012	<0.012	8260A	99050	0.500
Chlorobenzene	0.020	<0.020	8260A	99096	100.0
Chloroform	0.005	<0.005	8260A	99149	6.00
O-Cresol	0.010	<0.010	8270B	99150	200.0
M-Cresol	0.010	<0.010	8270B	99151	200.0
P-Cresol	0.010	<0.010	8270B	99152	200.0
Total Cresols	0.010	<0.010	8270B	99153	200.0
1,4-Dichlorobenzene	0.010	<0.010	8270B	99154	7.50
1,2-Dichloroethane	0.003	<0.003	8260A	99155	0.50
1,1-Dichloroethylene	0.013	<0.013	8260A	99156	0.70
2,4-Dinitrotoluene	0.010	<0.010	8270B	99157	0.13
Hexachlorobenzene	0.010	<0.010	8270B	99159	0.13
Hexachlorobutadiene	0.010	<0.010	8270B	99160	0.50
Hexachloroethane	0.010	<0.010	8270B	99161	3.00
Methl Ethyl Ketone	0.020	<0.020	8260A	99060	200.00
Nitrobenzene	0.010	<0.010	8270B	99062	2.00
Pentachlorophenol	0.050	<0.050	8270B	99064	100.00
Pyridine	0.010	<0.010	8270B	99066	5.00
Tetrachloroethylene	0.003	<0.003	8260A	99068	0.70
Trichloroethylene	0.012	<0.012	8260A	99076	0.50
2,4,5-Trichlorophenol	0.010	<0.010	8270B	99078	400.00
2,4,6-Trichlorophenol	0.010	<0.010	8270B	99080	2.00
Vinyl Chloride	0.018	<0.018	8260A	99162	0.20

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

Project: Chemetco

PAS Project Code: CSD-184

Sample Description: Zinc Oxide

PAS Sample No.: 9707234140

Miscellaneous

Parameters	Detection Limit mg/kg	Result mg/kg	E.P.A. Method	STORET Number	Regulatory Limit mg/kg
Cyanide, Total	1.0	<1.0	9010	00720	250.0
Sulfide, Total	1.0	<1.0	9030	00722	500.0
Phenolics, Total	1.0	<1.0	9065	99120	1000.0
EOX	10.0	<10.0	9023	99143	1000.0
pH (Units)	—	7.0	9040A	00400	2.0<pH<12.5
Flashpoint (°F)	—	>200°	D92	—	>140
Paint Filter	—	Pass	9095	—	No Free Liquids
% Total Solids	—	83.5%	D2216	—	—

Stephen R. Johnson

Stephen R. Johnson, Laboratory Director

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Form PAS-TCLP

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Sequence No.: 072597
Sample Spiked: 9707234139
Sample Duplicated: 9707234139
Date Reported: 28 July 1997

Project: Chemetco

PAS Project Code: CSD-184

Organic Analysis QAQC

Analytes	Amount Spike ug/l	Spike Result ug/l	Spike Recov ug/l	SD Result ug/l	SD Recov ug/l	RPD
Benzene	25	25	100	26	104	3.9
Carbon Tetrachloride	25	24	96	24	96	0.0
Chlorobenzene	25	23	92	25	100	8.3
Chloroform	25	22	88	21	84	4.7
o-Cresol	25	24	96	25	100	4.1
m-Cresol	25	25	100	23	92	8.3
p-Cresol	25	21	84	25	100	17.3
1,4-Dichlorobenzene	25	22	88	23	92	4.4
1,2-Dichloroethane	25	23	92	20	80	13.9
1,1-Dichloroethylene	25	23	92	24	96	4.3
2,4-Dinitrotoluene	25	23	92	25	100	8.3
Hexachlorobenzene	25	24	96	23	92	4.3
Hexachlorobutadiene	25	22	88	21	84	4.7
Hexachloroethane	25	23	92	21	84	9.1
Methyl Ethyl Ketone	25	24	96	22	88	8.7
Nitrobenzene	25	23	92	24	96	4.3

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Pentachlorophenol	25	18	72	20	80	10.5
Pyridine	25	19	76	22	88	7.1
Tetrachloroethylene	25	705	108	708	120	10.5
Trichloroethylene	25	22	88	23	92	4.4
2,4,5-Trichlorophenol	25	23	92	24	96	4.3
2,4,6-Trichlorphenol	25	23	92	24	96	4.3
Vinyl Chloride	25	22	88	21	84	4.7

Stephen R. Johnson

Stephen R. Johnson, Laboratory Director

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Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Sequence No.: 072597
Sample Spiked: 9707234139
Sample Duplicated: 9707234139
Date Reported: 28 July 1997

Project: Chemetco

PAS Project Code: CSD-184

Metal Analysis QAQC

Analytes	Amount Spiked ug	Sample Result ug	Duplicate ug	Spike ug	% Spike Recovery	RPD
Arsenic	2000	--	--	2200	94	0.0
Barium	2000	250	250	2050	90	0.0
Cadmium	2000	1240	1240	3290	102	0.0
Chromium	2000	--	--	2000	100	0.0
Lead	2000	40300	45200	42150	93	0.0
Mercury	25	--	--	23.2	92.8	0.0
Selenium	2000	--	--	2100	105	0.0
Silver	2000	--	--	2000	100	0.0

Stephen R. Johnson, Laboratory Director

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Form-METQAQC

ATTACHMENT 3
MSDS Sheets

MATERIAL PROFILE

COMPANY NAME:	Chemetco, Inc.	EPA I.D. #:	ILD048803809
STREET ADDRESS:	Route 3 and Chemetco Lane		
CITY-STATE-ZIP:	Hartford, Illinois 62048		
CONTACT NAME:	Michelle Reznack	PHONE:	618-254-4381, Ext. 219
		FAX:	618-254-0138

MATERIAL CHARACTERIZATION

NAME OF MATERIAL:	Crude Zinc Oxide		
PHYSICAL STATE:	Wet Sludge		
% SOLIDS:	70-75%	% MOISTURE:	25-30%
FREE LIQUIDS:	None present		
FLASHPOINT:	> 200°C		
MSDS AVAILABLE:	Yes		

CHEMICAL ANALYSIS (Weight percent unless indicated otherwise):

NICKEL	.2-.3%	CALCIUM	.8-1.5%	SULFATE	<1%
COBALT	<.1%	SODIUM	.5-1.0%	FLUORIDE	<.3%
CHROMIUM	<.1%	PLATINUM	NA	CHLORIDE	1.5-2%
COPPER	4-6%	PALLADIUM	NA	OTHERS	
ZINC	30-40%	GOLD	NA	All assays on a dry weight basis.	
IRON	1.3-1.9%	SILVER	.010-.020%		
VANADIUM	<.1%	LEAD	15-20%	TIN	2.5%
CADMIUM	.25-.30%	AMMONIA	0		
CYANIDE	0	SILICA	4-6%		
pH	8-11	SP. GRAVITY	1.15 g/ml (wet)		
ORGANICS	Carbonates				

To the best of our knowledge, the material does not contain:

- cyanides,
- PCB's,
- explosives,
- pyrophorics,
- sulfides,
- asbestos,
- poisons,
- pesticides/herbicides,
- phenolics,
- chlorinated hydrocarbons.

The only known or suspected carcinogens include cadmium and nickel.

PROCESS GENERATING THE MATERIAL:

Pyrometallurgical copper refining. Zinc is volatilized and blown out of the copper bath by the use of oxygen and air. The gases are cleaned by a wet scrubber system. Caustic is added to neutralize the slurry water and force precipitation of metals.

REGULATORY CLASSIFICATION OF MATERIAL:

U.S.EPA HAZARDOUS WASTE:	No
IEPA HAZARDOUS WASTE:	No

ACCORDING TO U.S.EPA REGULATIONS, (40CFR), THIS MATERIAL IS A **BY-PRODUCT**.

SHIPPING INFORMATION:

DOT INFORMATION

HAZARDOUS MATERIAL:	**No**
HAZARDOUS MATERIAL NAME:	**Environmentally Hazardous Substance, n.o.s.**
HAZARD CLASS:	**9**
REPORTABLE QUANTITY:	**1 POUND**
U.N. #:	**3077**
ORM #:	**ORM-E**
PLACARD REQUIREMENT:	**CLASS 9 PLACARD**[redacted]
SHIPPING LABEL:	**No**
WASTE MANIFEST REQUIRED:	**No**
PACKAGING:	**Bulk preferably, however bags or boxes are O.K.**
OTHER:	**Membrane Press dewatered filter cake with the consistency of wet modeling clay.**

MATERIAL SAFETY DATA SHEET

I. PRODUCT IDENTIFICATION

Product name: CRUDE ZINC OXIDE

Manufacturer's name: CHEMETCO, INC.

Address: ROUTE 3 AND OLDENBURG RD.
HARTFORD, ILL. 62048

Telephone No.: (618)-254-4381

II. HAZARDOUS INGREDIENTS

NAME	%	CAS #	OSHA PEL	ACGIH TLV
ZINC OXIDE	34-40	1344132	5mg/cu.m	5mg/cu.m
LEAD OXIDE	12-17	1309600	0.05mg/cu.m	0.15mg/cu.m
TIN OXIDE	1-3	7440315	0.1mg/cu.m	0.1mg/cu.m
COPPER OXIDE	5-7	1317391	1mg/cu.m	1mg/cu.m
CADMIUM OXIDE	< .5	1306190	0.02mg/cu.m	0.05mg/cu.m
SILVER OXIDE	< .2	20667123	0.01mg/cu.m	0.01mg/cu.m
IRON OXIDE	< 2	1309371	10mg/cu.m	5mg/cu.m
NICKEL OXIDE	< .4	1314063	0.1mg/cu.m	0.1mg/cu.m
SODIUM HYDROXIDE	< 1	1310732	2mg/cu.m	2mg/cu.m
POTASSIUM CHLORIDE	< 1	7447407	N/A	N/A
CALCIUM OXIDE	< 2	1305788	5mg/cu.m	5mg/cu.m
WATER (Moisture)		BALANCE		

III. PHYSICAL CHARACTERISTICS

Boiling point: 1970 C

Melting point: 1560 C

Specific gravity: 1.34

Reactivity in water: NONE

Solubility in water: INSOLUBLE

Appearance and odor: GREY MUD-LIKE SUBSTANCE WITH ITS OWN DISTINCT ODOR

IV. FIRE AND EXPLOSION DATA

NON FLAMMABLE

NON EXPLOSIVE

V. REACTIVITY DATA

NON REACTIVE AS A WHOLE. MATERIAL AS A WHOLE IS STABLE.

MATERIAL WILL NOT DECOMPOSE OR POLYMERIZE

VI. HEALTH HAZARD DATA

MATERIAL CONTAINS TOXIC SUBSTANCES. MINOR IRRITATION WILL OCCUR IF PROLONGED CONTACT WITH THE SKIN. USE PERSONNAL PROTECTIVE GEAR WHEN HANDLING. (SEE SECTION VIII)

***** NICKEL AND CADMIUM COMPOUNDS HAVE BEEN IDENTIFIED AS POTENTIAL HUMAN CARCINOGENS *****

VII. SPILL AND LEAK PROCEDURES

PREVENT OTHER PEOPLE FROM WALKING ON SPILLED MATERIAL AND CARRYING IT AWAY OR SPREADING IT.

SHOVEL SPILLED MATERIAL INTO PLASTIC CONTAINERS OR BAGS.

CLEAN AREA WITH WATER AND CONTAIN THE WATER USED FOR CLEAN-UP. DISPOSE WATER ACCORDING TO LOCAL AND FEDERAL RULES AND REGULATIONS.

VIII. SPECIAL PROTECTION INFORMATION

RUBBER BOOTS

RUBBER GLOVES

FULL-BODY WORKING UNIFORM

RESPIRATOR IF WORKING IN AN OXYGEN DEFFICIENT AREA

SPLASH-PROOF SHIELD OR GOGGLES

** The information herein is given in good faith, but no warranty, expressed or implied, is made.

ATTACHMENT 4
East Canal Stormwater Samples

Chain of Custody Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD ENV. SERVICES, INC.	Project	CHEMETCO
Address	2220 YALE BLVD.	Contact Person	CINDY DAVIS
City, State, Zip	SPRINGFIELD, IL 62703	P. O. #/ Invoice to:	
Phone Number	217/522-4085	Facsimile Number	217/522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling Date	Sampling Time	Container Size	Container No.	Preser-vative	Analysis Requested	PAS Sample Number
E-W CANAL	H_2O	7/2	PM	2-40ml 2-250ml 1-550ml	6		SEE ATTACHED	3673
N-S CANAL	H_2O	7/2	PM	1-4L "	6		"	3674
OIL DRY	SOLID	7/2	PM	GAL BAG	1		TCLP METALS + TCLP ORGANICS	3675
							IF TCLP METALS PASS, THEN RUN	
							PF FLASH pH CNS PHENOLS & SOLIDS	
							PCB'S	

Relinquished by: Shane A Thorpe		Received by: Millie Rose	
Date: 7/3/97	Time: 9:55A	Date: 07/03/97	Time: 9:55 AM
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-181

Form PASCOC1

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Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 02 July 1997
Date Received: 03 July 1997
Date Analyzed: 11 July 1997
Date Reported: 14 July 1997

Project: Chemetco

PAS Project Code: CSD-181

Sample Description:	E-W Canal	N-S Canal
PAS Sample Number:	9707023673	9707023674

Conventional & Nonconvential Pollutants Table 2F-2

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	E.P.A. Method
Aluminum, Total	0.045	0.40	0.20	6010A
Barium, Total	0.010	0.03	0.04	6010A
Boron, Total	0.100	8.6	11.0	6010A
Bromide	1.0	529	506	4110
Chlorine, Total Residual	0.1	<0.1	<0.1	4500 Cl
Cobalt, Total	0.100	<0.100	<0.100	6010A
Fluoride	0.10	263	94	4110
Iron, Total	0.020	2.1	6.2	6010A
Magnesium, Total	0.005	11.6	20.0	6010A
Molybdenum, Total	0.10	1.2	0.7	6010A
Nitrate-Nitrite	0.10	1.1	<0.1	4110
Nitrogen, Total Kjedahl	1.0	3.3	2.4	4500 -N_{ORG}
Oil & Grease	1.0	7	<1.0	5520
Phosphorus	0.05	1.2	0.61	4500 -P
Sulfate	1.0	3234	3572	4110
Sulfide	0.1	<0.1	<0.1	4500 -S^{2-}
Sulfite	0.1	<0.1	<0.1	4500 - SO_3^{2-}
Surfactants	0.025	0.265	0.221	5540C
Tin, Total	0.02	0.03	<0.02	6010A
Titanium, Total	0.01	<0.01	<0.01	6010A
Fecal Coliform (Colonies/100ml)	---	<1.0	<1.0	9221

/Stephen R. Johnson Laboratory Director

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PAS Project Code: CSD-181

Sample Description:	E-W Canal	N-S Canal
PAS Sample Number:	9707023673	9707023674

Toxic Pollutants & Total Phenols - Table 2F-3

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	E.P.A. Method
Antimony, Total	0.03	0.07	0.03	6010A
Arsenic, Total	0.05	0.07	<0.05	6010A
Beryllium, Total	0.0003	<0.0003	<0.0003	6010A
Cadmium, Total	0.004	0.10	0.10	6010A
Chromium, Total	0.007	<0.007	<0.007	6010A
Copper, Total	0.006	1.31	0.67	6010A
Lead, Total	0.04	2.62	0.73	6010A
Mercury, Total	0.0002	0.0008	<0.0002	7470
Nickel, Total	0.015	<0.015	<0.015	6010A
Selenium, Total	0.075	0.30	<0.075	6010A
Silver, Total	0.007	<0.007	<0.007	6010A
Thallium, Total	0.04	<0.04	0.07	6010A
Zinc, Total	0.002	2.59	2.59	6010A
Cyanide	0.5	<0.5	<0.5	9010
Phenols	0.1	<0.1	<0.1	9067

Stephen R. Johnson

Stephen R. Johnson, Laboratory Director

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Project: Chemetco

PAS Project Code: CSD-181

Sample Description:	E-W Canal	N-S Canal
PAS Sample Number:	9707023673	9707023674

Volatile Organic Compounds - (Method 8260A) - Table 2F-3

Parameters	Detection Limit ug/l	Result ug/l	Result ug/l	E.P.A. Method
Acrolein	10	<10	<10	8260A
Acrylonitrile	10	<10	<10	8260A
Benzene	5	<5	<5	8260A
Bromoform	5	<5	<5	8260A
Carbon Tetrachloride	5	<5	<5	8260A
Chlorobenzene	5	<5	<5	8260A
Chlorodibromomethane	5	<5	<5	8260A
Chloroethane	5	<5	<5	8260A
2-Chloroethylvinyl Ether	5	<5	<5	8260A
Chloroform	5	<5	<5	8260A
Dichlorobromomethane	5	<5	<5	8260A
1,1-Dichloroethane	5	<5	<5	8260A
1,2-Dichloroethane	5	<5	<5	8260A
1,1-Dichloroethene	5	<5	<5	8260A
1,2-Dichloropropane	5	<5	<5	8260A
1,3-Dichloropropylene	5	<5	<5	8260A
Ethylbenzene	5	<5	<5	8260A
Methyl Bromide	5	<5	<5	8260A
Methyl Chloride	5	<5	<5	8260A
Methylene Chloride	5	<5	<5	8260A
1,1,2,2-Tetrachloroethane	10	<10	<10	8260A
Tetrachloroethylene	5	<5	<5	8260A
Toulene	5	<5	<5	8260A

Form PAS-RWBTEX

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An Environmental and Agricultural Testing Laboratory

Project No.: Chemetco PAS Project Code: CSD-181

Sample Description:	E-W Canal	N-S Canal
PAS Sample Number	9707023673	9707023674

Volatile Organic Compounds - (Method 8260A) - Table 2F-3(Cont.)

Parameters	Detection Limit ug/l	Result ug/l	Result ug/l	E.P.A. Method
1,2-trans-Dichloroethylene	5	<5	<5	8260A
1,1,1-Trichloroethane	5	<5	<5	8260A
1,1,2-Trichloroethane	5	<5	<5	8260A
Trichloroethylene	5	<5	<5	8260A
Vinyl Chloride	10	<10	<10	8260A
Surrogates	Recovery Limit	% Recovery	% Recovery	
1,2-Dichloroethane d4	80-120%	93%	93%	
4-Bromofluorobenzene	80-120%	93%	94%	
Toluene d8	80-120%	99%	99%	

Stephen R. Johnson

Stephen R. Johnson, Laboratory Director

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Form PAS-RWBTEX

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An Environmental and Agricultural Testing Laboratory

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Springfield, IL 62703

Date Sampled: 02 July 1997
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Date Reported: 14 July 1997

Project: Chemetco

PAS Project Code: CSD-181

Sample Description:	E-W Canal	N-S Canal
PAS Sample Number:	9707023673	9707023674

8270 Base/Neutral/Acid Extractable Compounds - Table 2F-3

Analytes	Detection Limit ug/l	Result ug/l	Result ug/l	E.P.A. Method
2-Chlorophenol	10	<10	<10	8270B
2,4-Dimethylphenol	10	<10	<10	8270B
2,4-Dinitrophenol	50	<50	<50	8270B
4,6-Dinitro-O-Cresol	50	<50	<50	8270B
2,4-Dinitrophenol	50	<50	<50	8270B
2-Nitrophenol	50	<50	<50	8270B
4-Nitrophenol	50	<50	<50	8270B
p-Chloro-M-Cresol	50	<50	<50	8270B
Pentachlorophenol	50	<50	<50	8270B
Phenol	10	<10	<10	8270B
2,4,5-Trichlorophenol	10	<10	<10	8270B
Acenaphthene	10	<10	<10	8270B
Acenaphthylene	10	<10	<10	8270B
Anthracene	10	<10	<10	8270B
Benzidine	10	<10	<10	8270B
Benzo (a) Anthracene	10	<10	<10	8270B
Benzo (a) Pyrene	10	<10	<10	8270B
3,4-Benzofluoranthene	10	<10	<10	8270B
Benzo (g,h,i) Perylene	10	<10	<10	8270B
Benzo (k) Fluoranthene	10	<10	<10	8270B
Bis (2-chloroethoxy) Methane	10	<10	<10	8270B
Bis (2-chloroethyl) Ether	10	<10	<10	8270B
Bis (2-chloroisopropyl) Ether	10	<10	<10	8270B
Bis (2-ethylhexyl) Phthalate	10	<10	<10	8270B
4-Bromophenyl Phenyl Ether	10	<10	<10	8270B

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Project No.: Chemetco

PAS Project Code: CSD-181

Sample Description:	E-W Canal	N-S Canal
PAS Sample Number:	9707023673	9707023674

8270 Base/Neutral/Acid Extractable Compounds - Table 2F-3(Cont.)

Parameters	Detection Limit ug/l	Result ug/l	Result ug/l	E.P.A. Method
Butyl Benzyl Phthalate	10	<10	<10	8270B
2-Chloronaphthalene	10	<10	<10	8270B
4-Chlorophenyl Phenyl Ether	10	<10	<10	8270B
Chrysene	10	<10	<10	8270B
Dibenzo (a,h) Anthracene	10	<10	<10	8270B
1,2-Dichlorobenzene	10	<10	<10	8270B
1,3-Dichlorobenzene	10	<10	<10	8270B
1,4-Dichlorobenzene	10	<10	<10	8270B
3,3'-Dichlorobenzidine	20	<20	<20	8270B
Diethyl Phthalate	10	<10	<10	8270B
Dimethyl Phthalate	10	<10	<10	8270B
Di-N-Butylphthalate	10	<10	<10	8270B
2,4-Dinitrotoluene	10	<10	<10	8270B
2,6-Dinitrotoluene	10	<10	<10	8270B
Di-N-Octyl Phthalate	10	<10	<10	8270B
1,2-Diphenylhydrazine	10	<10	<10	8270B
Fluoranthene	10	<10	<10	8270B
Fluorene	10	<10	<10	8270B
Hexachlorobenzene	10	<10	<10	8270B
Hexachlorobutadiene	10	<10	<10	8270B
Hexachloroethane	10	<10	<10	8270B
Indeno (1,2,3-c,d) Pyrene	10	<10	<10	8270B
Isophorone	10	<10	<10	8270B
Naphthalene	10	<10	<10	8270B
Nitrobenzene	10	<10	<10	8270B
N-Nitrosodimethylamine	10	<10	<10	8270B
N-Nitrosodi-N-propylamine	10	<10	<10	8270B
N-Nitrosodiphenylamine	10	<10	<10	8270B

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Form PAS-RS8270

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Project No.: Chemetco

PAS Project Code: CSD-181

Sample Description:	E-W Canal	N-S Canal
PAS Sample Number:	9707023673	9707023674

8270 Base/Neutral/Acid Extractable Compounds - Table 2F-3(Cont.)

Parameters	Detection Limit ug/l	Result ug/l	Result ug/l	E.P.A. Method
Phenanthrene	10	<10	<10	8270B
Pyrene	10	<10	<10	8270B
1,2,4-Trichlorobenzene	10	<10	<10	8270B
Surrogates	Recovery Limit	% Recovery	% Recovery	
Nitrobenzene d5	35-114%	56%	65%	
Terphenyl d14	33-141%	80%	107%	
2-Fluorobiphenyl	43-116%	87%	77%	
Phenol d6	10-94%	69%	27%	
2-Fluorophenol	21-100%	90%	54%	
2,4,6-Tribromophenol	10-123%	104%	107%	

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Date Analyzed: 11 July 1997
Date Reported: 14 July 1997

Project: Chemetco

PAS Project Code: CSD-181

Sample Description:	E-W Canal	N-S Canal
PAS Sample Number:	9707033673	9707033674

Pesticides - Table 2F-3

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	E.P.A. Method
Aldrin	0.004	<0.004	<0.004	8081
alpha-BHC	0.003	<0.003	<0.003	8081
beta-BHC	0.006	<0.006	<0.006	8081
delta-BHC	0.009	<0.009	<0.009	8081
gamma-BHC (Lindane)	0.004	<0.004	<0.004	8081
Chlordane	0.014	<0.014	<0.014	8081
4,4'-DDD	0.011	<0.011	<0.011	8081
4,4'-DDE	0.004	<0.004	<0.004	8081
4,4'-DDT	0.012	<0.012	<0.012	8081
Dieldrin	0.002	<0.002	<0.002	8081
Alpha-Endosulfan	0.014	<0.014	<0.014	8081
Beta-Endosulfan	0.004	<0.004	<0.004	8081
Endosulfan Sulfate	0.066	<0.066	<0.066	8081
Endrin	0.006	<0.006	<0.006	8081
Endrin Aldehyde	0.023	<0.023	<0.023	8081
Heptachlor	0.003	<0.003	<0.003	8081
Heptachlor Epoxide	0.083	<0.083	<0.083	8081
Toxaphene	0.240	<0.240	<0.240	8081
Aroclor 1016	0.050	<0.050	<0.050	8081
Aroclor 1221	0.065	<0.065	<0.065	8081
Aroclor 1232	0.065	<0.065	<0.065	8081
Aroclor 1242	0.065	<0.065	<0.065	8081
Aroclor 1248	0.090	<0.090	<0.090	8081

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Project: Chemecto PAS Project Code: CSD-181

Sample Description:	E-W Canal	N-S Canal
PAS Sample Number:	9707033673	9707033674

Pesticides - Table 2F-3 (Cont.)

Analyte	Detection Limit mg/l	Result mg/l	Result mg/l	E.P.A. Method
Aroclor 1254	0.10	<0.10	<0.10	8081
Aroclor 1260	0.10	<0.10	<0.10	8081
Aroclor 1262	0.10	<0.10	<0.10	8081
Aroclor 1268	0.10	<0.10	<0.10	8081
Surrogates	**Recovery Limit**	**% Recovery**	**% Recovery**	
2,4,5,6-Tetrachloro-m-xylene	35-114%	75%		
Dibutyl Chlorendate	35-114%	91%		

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Form PAS-RWPCB

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Project: Chemetco

PAS Project Code: CSD-181

Sample Description:	E-W Canal	N-S Canal
PAS Sample Number:	9707033673	9707033674

Hazardous Substances - Table 2F-4

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	E.P.A. Method
Acetaldehyde	0.110	<0.110	<0.110	8315
Allyl alcohol	---	ND	ND	8260A
Allyl chloride	---	ND	ND	8260A
Aniline	0.010	<0.010	<0.010	8270B
Benzyl chloride	0.005	<0.005	<0.005	8121
Butylamine	0.010	<0.010	<0.010	8260A
Carbaryl	0.002	<0.002	<0.002	8318
Carbofuran	0.002	<0.002	<0.002	8318
Carbon disulfide	0.005	<0.005	<0.005	8260A
Chloropyrifos	0.001	<0.001	<0.001	8321
Coumaphos	0.001	<0.001	<0.001	8321
Cresol	0.001	<0.001	<0.001	8270B
Crotonaldehyde	0.006	<0.006	<0.006	8315
Cyclohexane	0.006	<0.006	<0.006	8315
2,4-D	0.029	<0.029	<0.029	8321
Diazinon	0.001	<0.001	<0.001	8321
Dicamba	0.054	<0.054	<0.054	8321
Dichlobenil	---	ND	ND	8081
Dichlone	---	ND	ND	8270
2,2-Dichloropropionic acid	---	ND	ND	8270
Dichlorvos	0.001	<0.001	<0.001	8321
Diethyl amine	---	ND	ND	8260A
Dimethyl amine	---	ND	ND	8260A

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Project: Chemetco | PAS Project Code: CSD-181

Sample Description:	E-W Canal	N-S Canal
PAS Sample Number:	9707033673	9707033674

Hazardous Substances - Table 2F-4 (Cont.)

Analyte	Detection Limit mg/l	Result mg/l	Result mg/l	E.P.A. Method
Dinitrobenzene	0.010	<0.010	<0.010	8090
Diquat	—	ND	ND	549.1
Disulfoton	0.001	<0.001	<0.001	8321
Diuron	0.001	<0.001	<0.001	8270B
Epichlorohydrin	0.001	<0.001	<0.001	8260A
Ethion	0.001	<0.001	<0.001	8270B
Ethylene diamine	0.001	<0.001	<0.001	8260A
Ethylene dibromide	0.001	<0.001	<0.001	8260A
Formaldehyde	0.001	<0.001	<0.001	8315
Furfural	0.001	<0.001	<0.001	8270B
Guthion	0.001	<0.001	<0.001	8270B
Isoprene	0.001	<0.001	<0.001	8270B
Isopropanolamine	—	ND	ND	8270B
Kelthane	—	ND	ND	8270B
Kepone	—	ND	ND	8270B
Malathion	0.001	<0.001	<0.001	8270B
Marcaptodimethur	—	ND	ND	8270B
Methoxychlor	0.057	<0.057	<0.057	8270B
Methyl mercaptan	0.001	<0.001	<0.001	8270B
Methyl methacrylate	0.001	<0.001	<0.001	8260A
Methyl parathion	0.001	<0.001	<0.001	8321
Mevinphos	0.001	<0.001	<0.001	8321
Mexacarbate	---	ND	ND	8270B
Monomethyl amine	—	ND	ND	8270B
Naled	0.001	<0.001	<0.001	8321
Nitrotoluene	0.001	<0.001	<0.001	8321
Parathion	0.001	<0.001	<0.001	8270B
Phenolsulfonate	---	ND	ND	8270B
Propargite	---	ND	ND	8270B

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Form PAS-RWPCB

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Project: Chemetco | PAS Project Code: CSD-181

	E-W Canal	N-S Canal
Sample Description:	E-W Canal	N-S Canal
PAS Sample Number:	9707033673	9707033674

Hazardous Substances - Table 2F-4 (Cont.)

Analyte	Detection Limit mg/l	Result mg/l	Result mg/l	E.P.A. Method
Pyrethrins	---	ND	ND	8081
Quinoline	---	ND	ND	8270B
Resorcinol	---	ND	ND	8270B
Strontium	0.0005	<0.0005	<0.0005	6010A
Styrene	0.005	<0.005	<0.005	8260A
2,4,5-T	0.034	<0.034	<0.034	8321
2,4,5-TP	0.034	<0.034	<0.034	8321
Trichlorofon	---	ND	ND	8321
Triethylamine	---	ND	ND	8270B
Uranium	0.01	<0.01	<0.01	6010A
Vanadium	0.008	<0.008	<0.008	6010A
Vinyl acetate	0.005	<0.005	<0.005	8260A
Xylene	0.005	<0.005	<0.005	8260A
Xylenol	0.005	<0.005	<0.005	8260A
Zirconium	0.01	<0.01	<0.01	6010A

ND = Not Detected on the Total Ion Chromatogram

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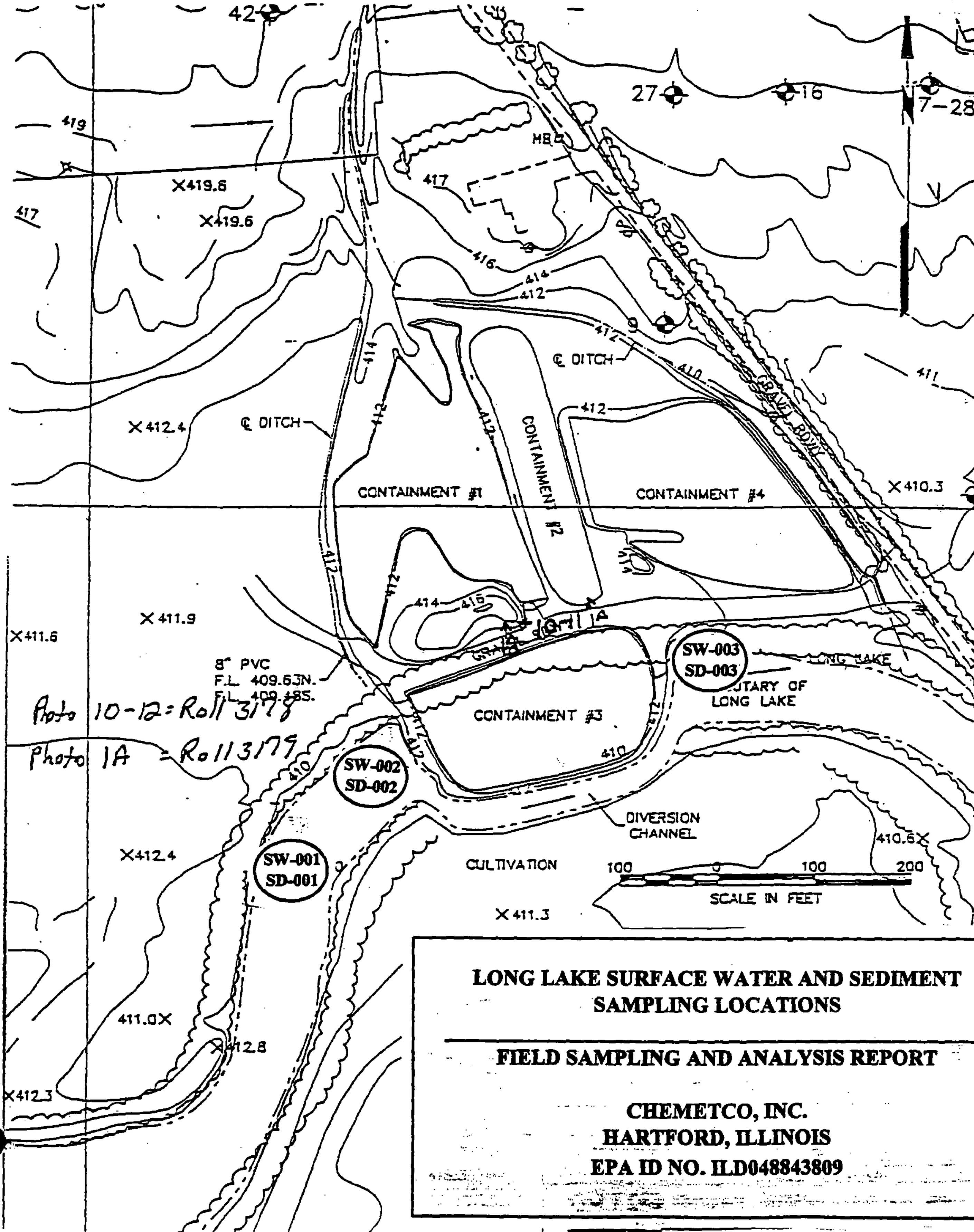
Form PAS-RWPCB

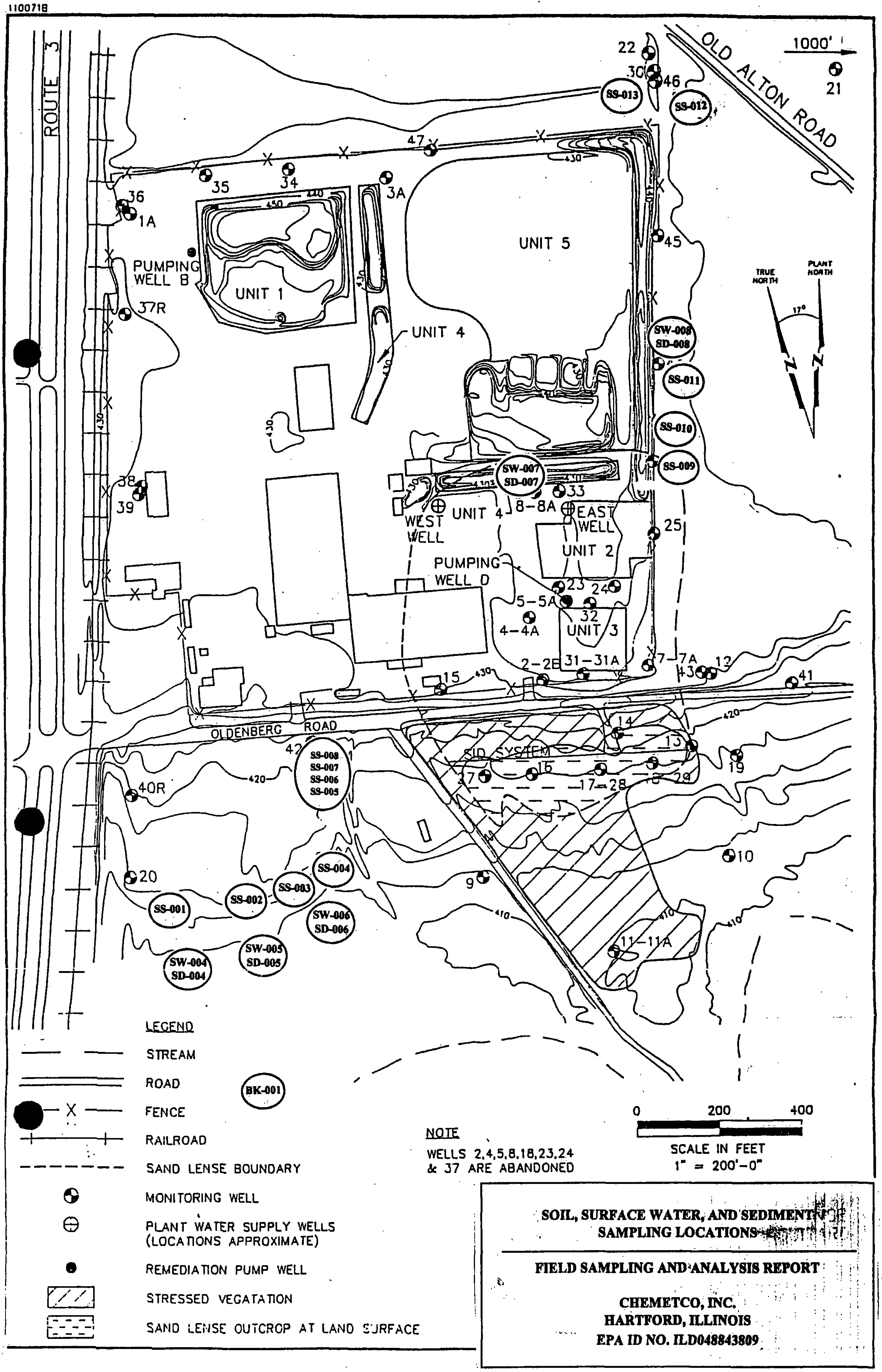


LONG LAKE SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS

FIELD SAMPLING AND ANALYSIS REPORT

CHEMETCO, INC.
HARTFORD, ILLINOIS
EPA ID NO. ILD048843809

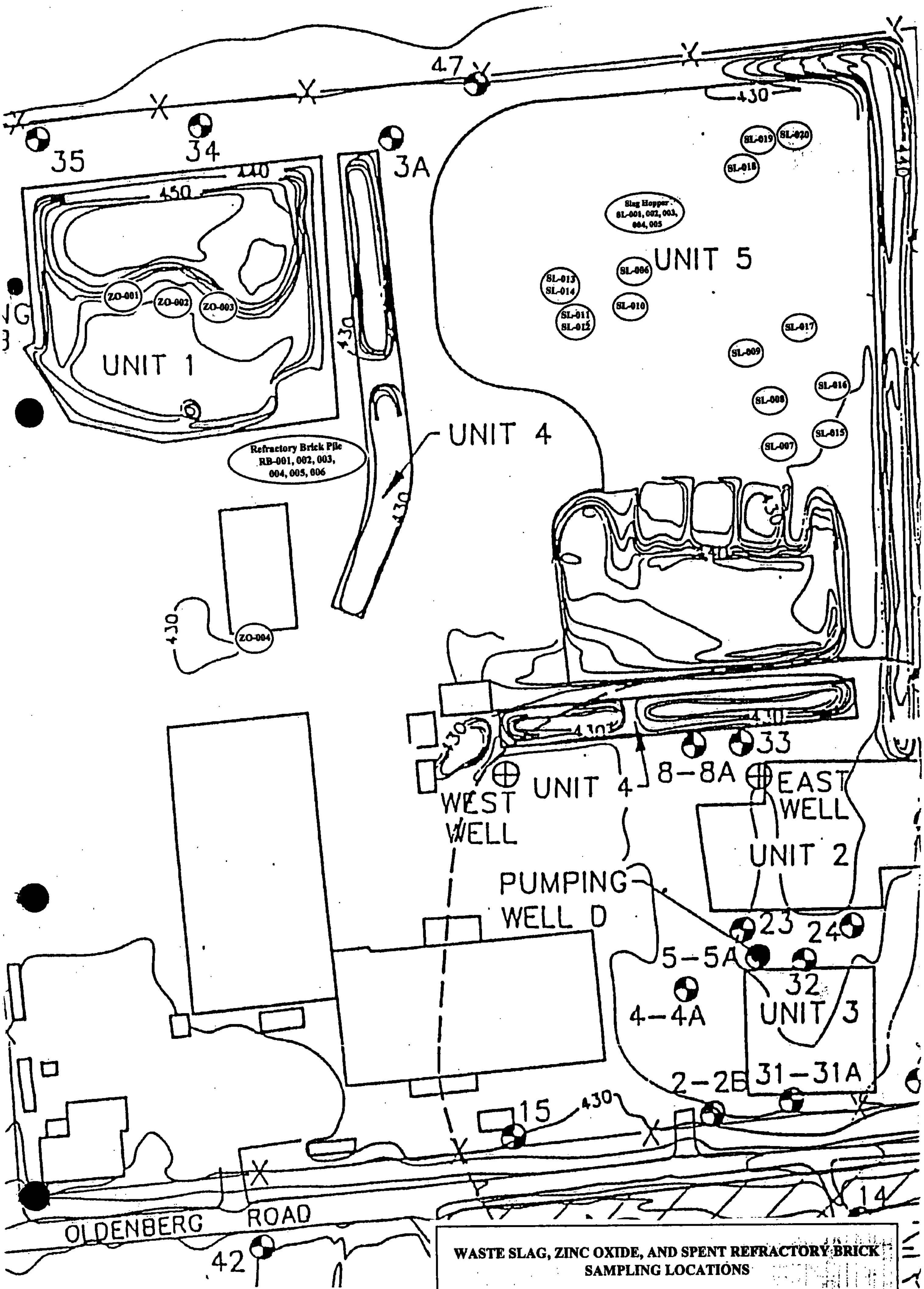
1100718



SOIL, SURFACE WATER, AND SEDIMENT SAMPLING LOCATIONS

FIELD SAMPLING AND ANALYSIS REPORT

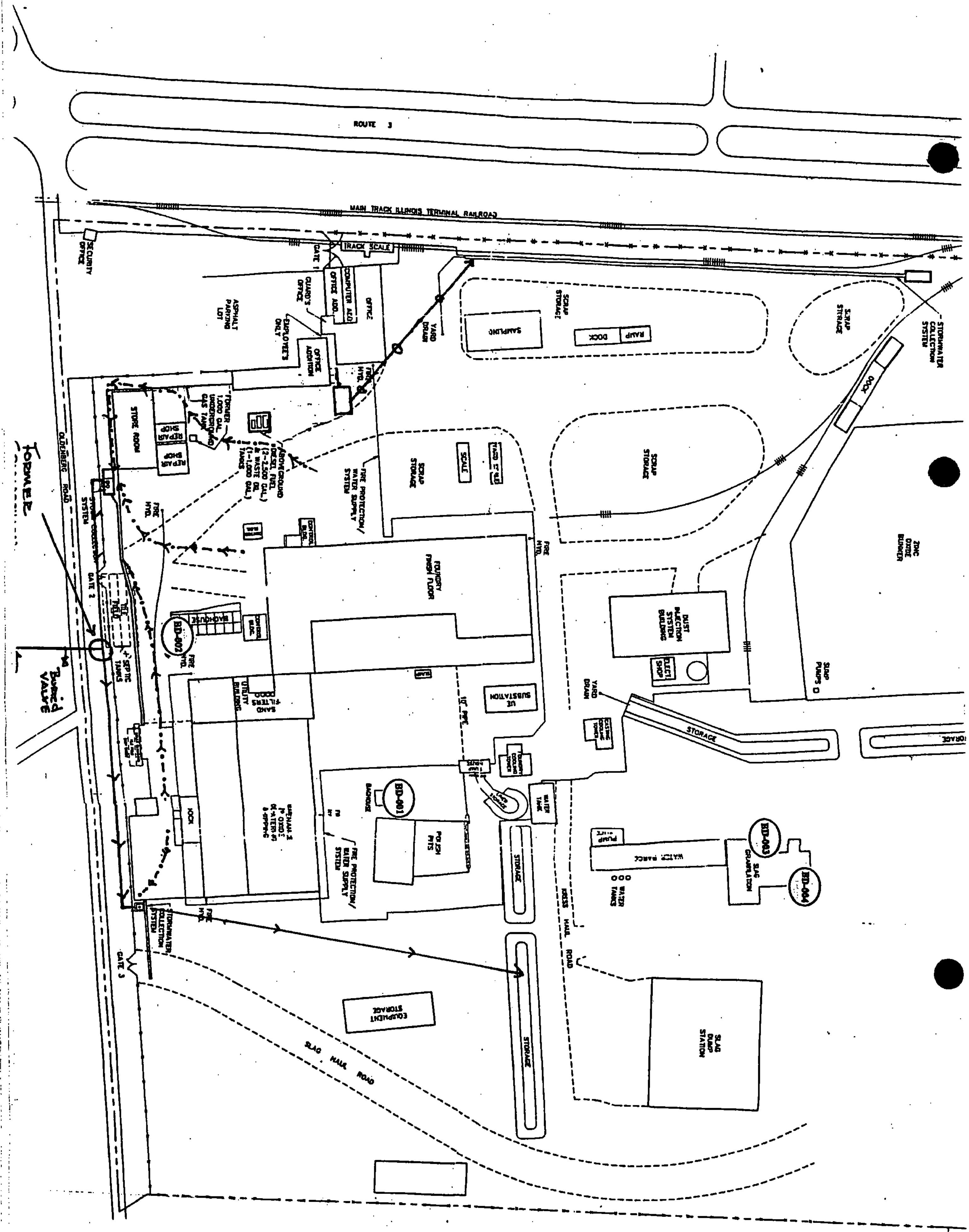
**CHEMETCO, INC.
HARTFORD, ILLINOIS
EPA ID NO. ILD048843809**



WASTE SLAG, ZINC OXIDE, AND SPENT REFRACTORY BRICK SAMPLING LOCATIONS

FIELD SAMPLING AND ANALYSIS REPORT

CHEMETCO, INC.
HARTFORD, ILLINOIS
EPA ID NO. ILD048843809



BAGHOUSE DUST
SAMPLING LOCATIONS

FIELD SAMPLING AND ANALYSIS REPORT

CHEMETCO, INC.
HARTFORD, ILLINOIS
EPA ID NO. ILD048843809

CSD Environmental Services, Inc.

CHEMETCO
WASTE ANALYSIS PLAN
FOR ON-SITE TREATMENT OF ZINC OXIDE

Prepared for:

CHEMETCO
1198010003– Madison
Route 3 Hartford, Illinois
ILD048843809

January 18, 2000

Chemetco, Inc.
Waste Analysis Plan
Zinc Oxide Treatment
January 17, 2000

Facility Description

Chemetco Inc., is a secondary copper smelter and recycler located in a primarily agricultural area sightly south of Hartford, Illinois and north of St. Louis, Missouri. Secondary copper smelters separate and purify the metal values from low-grade copper bearing materials such as copper and copper alloy scrap, slags, skimmings and other non-ferrous materials. Chemetco produces an unalloyed (versus "alloyed", i.e., brass and bronze) anode. The facility is located within a primary agriculture, light residential area south of Hartford is bounded on the west by major, heavily traveled rail and highway routes and on the south by a private secondary road referred to as Chemetco Lane. More specifically, the 40+ acre plant site in the Southeast 1/4, Section 16, Township 4 North, Range 9 West of the third Principal Meridian, in Madison County.

Waste Analysis

The material to be treated on site consists of zinc oxide. The chemical analysis data provided in the MSDS sheets lists zinc oxide as containing the following: nickel at 0.2 - 0.3%; copper 4-6%; zinc 30-40%; iron 1.3-1.9%; cadmium 0.25-0.30%; calcium 0.8-1.5%; sodium 0.5-1.0%; silver 0.010-0.020%; lead 15-20%; silica 4-6%; chloride 1.5-2% and tin at 2.5%. Based upon the MSDS data, the major constituents of zinc oxide are zinc and lead. A copy of the MSDS sheets is provided in Attachment 1 to this document. A sample of the zinc oxide was collected on July 27, 1997 from the top 0-5" in depth by CSD Environmental for a limited organic/inorganic scan. No organics were detected in the scan. Refer to Table 1 for a summary of the results. Samples of the zinc oxide were also collected by the IEPA for total and TCLP metal analysis of the RCRA 8 metals. The TCLP results indicate the samples failed for cadmium and lead. The remaining metals were all below hazardous regulatory guidelines in 35 Ill. Adm. Code, Part 721. In addition, the metal concentrations were compared to the Tier 1 Clean up Objectives for migration to Class I groundwater in 35 Ill. Adm. Code, Part 742, Appendix B, Table B. All the metals except for cadmium and lead were below the Tier 1 objectives.

Waste codes of D006 and D008 have been assigned to the waste stream. A copy of the analytical results referenced above are provided in Attachment 1.

Land Disposal Restrictions

Hazardous waste with codes D006 and D008 are restricted from land disposal without further treatment. Lead, a D008 waste has a treatment standard of 0.75 mg/l and cadmium a D006 waste has a treatment standard of 0.11 mg/l using SW846 method 1311 Toxicity

Characteristic Leachate Procedure (TCLP).

Underlying Hazardous Constituents

Via promulgation of the May 1993 interim final rule, the September 1994 Phase II rule, the April 1996 Phase III rule (and associated corrections), and the May 1998 Phase IV, Part 2 rule, all characteristic waste must be treated such that underlying hazardous constituents meet the universal treatment standards (UTS) when not managed in Clean Water Act or Clean Water Act equivalent/Class I SDWA systems. Refer to Table 1 for a summary of the underlying hazardous constituent/ dilution requirements. Underlying constituents in certain D001-D043 waste must be treated to meet both the organic and metal/inorganic UTS before land disposal. Refer to Figures1 and 2 for a worksheet to determine the analytical requirements for waste subject to the land disposal restrictions and requirements applicable to characteristic wastes.

For characteristic wastes, generators must analyze for UTS constituents that are reasonably expected to be present in wastes not managed in CWA/CWA equivalent/Class I SDWA systems. Based upon generator knowledge of the waste stream and analytical testing, no other underlying hazardous constituents are expected to be of concern in the waste.

Treatment Process

Pursuant to 40 CFR 262.34(a) and 35 Ill. Adm. Code, 722.134(a); generators who treat hazardous wastes in 90 day accumulation tanks, containers, or containment buildings are not required to obtain a storage permit. The zinc oxide has been contained on the ground within a surface impoundment prior to treatment. A permit application pursuant to 35 Ill. Adm. Code, Part 703 has been submitted to the Illinois Environmental Protection Agency for a Remedial Action Permit of a temporary unit to conduct waste treatment. Treatment of wastes in tanks, containers or containment buildings requires the generator to have a written waste analysis plan to be kept onsite and available for inspection. This document was prepared to meet those requirements.

Definitions

Container - as defined by 40 CFR 260.10, is a portable device in which a material is stored, transported, treated or disposed of, or otherwise handled.

Treatment - as defined by 35 Ill. Adm. Code 720.110 is any method, technique or process including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste non-hazardous, or less hazardous; safer to transport, store or dispose of; or amendable for recovery, amendable for storage, or reduce in volume.

Underlying Hazardous Constituents - as defined by 35 Ill. Adm. Code, Part 728.102, means any regulated constituents listed in Section 728. Table U, "universal treatment standards (UTS)", except vanadium and zinc, that can reasonably be expected to be present at the point of generation of the hazardous waste, at a concentration above the constituents specific UTS treatment standard.

Sampling and Analysis

Samples of the treated waste stream will be collected during start-up on the first and tenth loads. Thereafter it is proposed to collect samples on approximately 10% of the loads or on a frequency established by the accepting landfill. All sample results will be retained on site and will be available for inspection. The samples will be collected using the following procedures:

- The sampler shall wear a new pair of latex gloves;
- A composite sample from each treated load will be collected by splitting the container into three areas. A proportionate amount from each area shall be collected and placed into an 8 ounce laboratory supplied jar;
- The jar shall be sealed and properly labeled;
- A chain of custody will be completed by the sampler; and
- The samples will be transported to the laboratory within 24 hours of collection.

The treated waste stream will be analyzed for the parameters listed in Table 1 using SW846 method 1311 Toxicity Characteristic Leachate Procedure (TCLP). Based upon generator knowledge of the waste stream and analytical testing, no other hazardous waste characteristics are expected to be of concern in the waste.

Disposal

The waste stream after treatment may be disposed of in a solid waste landfill in accordance with 35 Ill. Adm. Code, Part 728.109. Illinois regulations specify the waste is also a special waste. The treated waste will be transported and disposed of as a special waste pursuant to 35 Ill. Adm Code, Part 809 at a permitted facility.

Recordkeeping

This waste analysis plan will be kept on site for a period of three years after treatment ceases.

Notifications and Certifications

Pursuant to 35 Ill. Adm. Code, 728.109(d) wastes which meet applicable treatment standards and are shipped to an offsite permitted Subtitle D facility, must submit to the IEPA by 12/31/2000 a one time notification and certification. In addition, a one time certification and notification must be sent to the receiving facility (landfill) pursuant to 35 Ill. Adm. Code 728.107. A copy of the notices and certifications will be kept in the facility files. An example of the notices and certifications to be completed are attached as Attachment 2.

TABLE 1
UNIVERSAL TREATMENT STANDARDS for METAL/INORGANIC WASTES

UHC	Regulatory Level TCLP (mg/l)	Non-wastewater TCLP (mg/l) unless rated as mg/kg[1]
Antimony	N/A	1.15
Arsenic	5.0	5.0
Barium	100.0	21.0
Beryllium	N/A	1.22
Cadmium	1.0	0.11
Chromium (tot)	5.0	0.60
Cyanide (tot)	N/A	590 mg/kg[3]
Cyanide (amenable)	N/A	30 mg/kg[3]
Lead	5.0	0.75
Mercury (retort residues)[2]	0.2	0.20
Mercury (all others)[2]	0.2	0.025
Nickel	N/A	11.0
Silver	5.0	0.14
Thallium	N/A	0.20
Zinc[4]	N/A	4.3

N/A=Not Applicable to TCLP

[1]Concentrations standards for non-wastewaters are based on analysis of grab samples

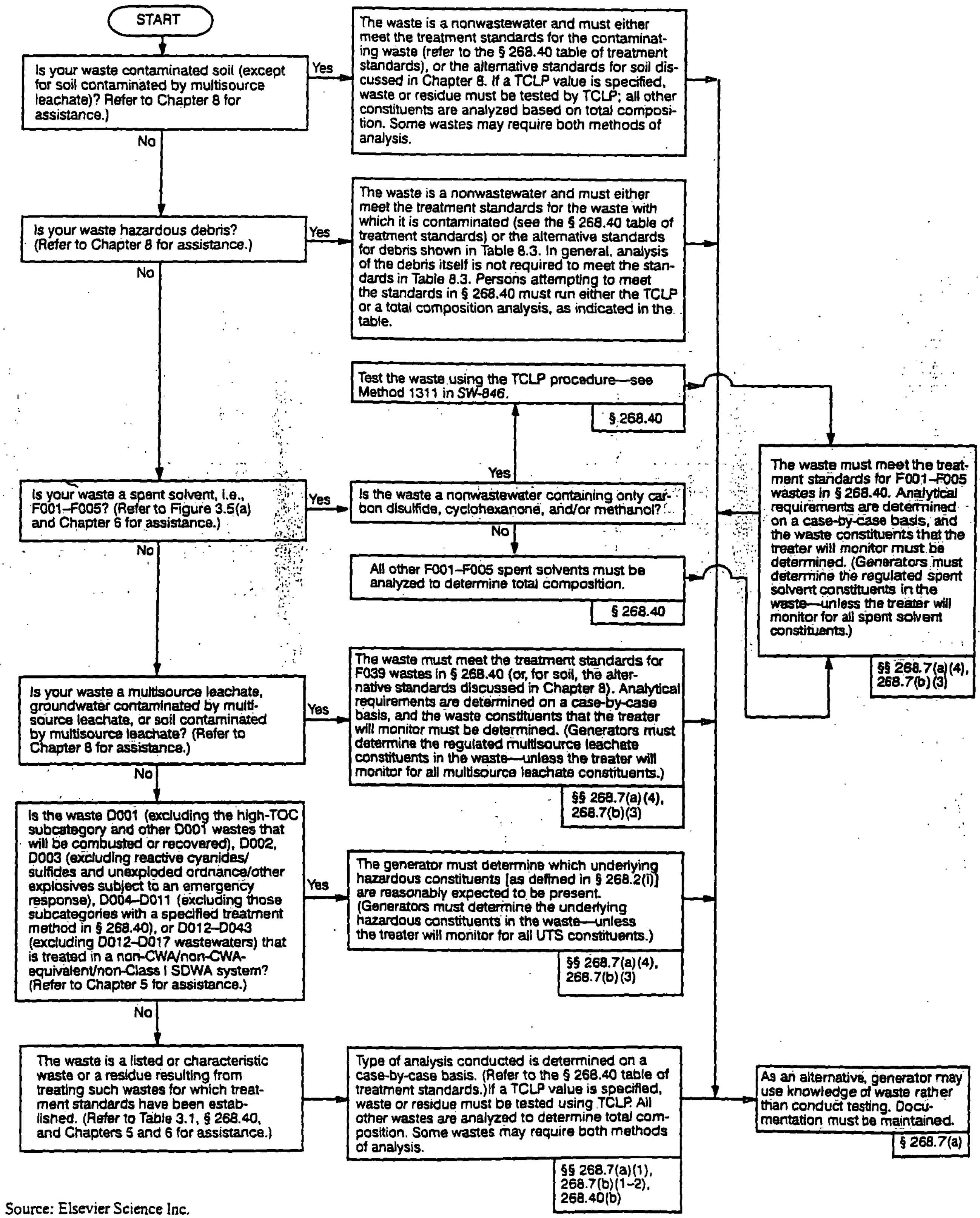
[2]Applicable to low mercury (<260 mg/kg) subcategory

[3]These values are not TCLP concentration-based standards; they are total concentration standards that are analyzed using SW-846 method 9010 or 9012 (based on a sample size of 10 grams and a distillation time of one hour and fifteen minutes.

[4]This constituent is not an "underlying hazardous characteristics constituent" in characteristics waste, but was added to the UTS list based upon generator knowledge of the waste.

Figure 1

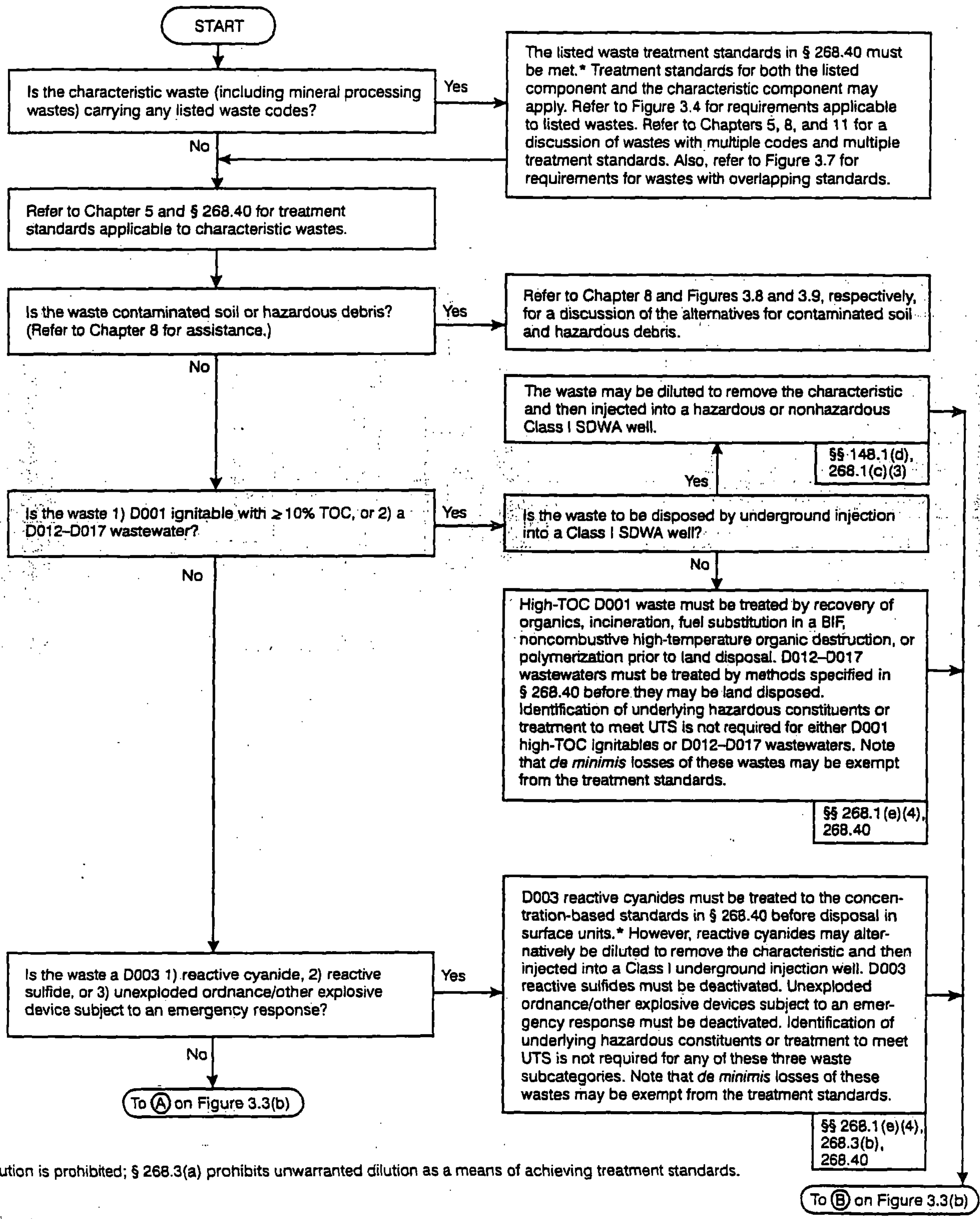
Analytical Requirements for Wastes Subject to the Land Disposal Restrictions



Source: Elsevier Science Inc.

ISBN 0-444-10036-9

Figure 2
Requirements Applicable to Characteristic Wastes



*Dilution is prohibited; § 268.3(a) prohibits unwarranted dilution as a means of achieving treatment standards.

...ce: Elsevier Science Inc.

ISBN 0-444-10036-9

Attachment 1

MSDS and Analytical Results

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

2009 Mall Street, Collinsville, IL 62234

618/346-5120

October 29, 1996

John G. Cotter, Environmental Coordinator
Chemetco, Inc.
P.O. Box 67
Hartford, Illinois 62048

Re: 1198010003 - Madison County
Chemetco, Inc.
ILD0048843809
FOS File

Dear Mr. Cotter:

Attached are the results of the sampling the Agency conducted at your facility on September 18, 1996.

If you should have any questions concerning these results, please contact me at 618/346-5120.

Sincerely,

ENVIRONMENTAL PROTECTION AGENCY

Chris N. Cahnovsky

Chris N. Cahnovsky, CHMM
Bureau of Land

CNC:cas
Attachments

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

X101

Lab Name: ARDL, INC. Contract No.: 2424

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: X101

Matrix (soil/water) SOIL Lab Sample ID: 2424-1

Level (low/med): LOW Date Received: 09/19/96

% Solids: 72.4

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	35.1			P
7440-39-3	Barium	1350			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	940			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	163		N	P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	30000		E	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	3.2			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	4.0	B	N E	F
7440-22-4	Silver	51.7			P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: SMALL ROCKS

TCLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

X101

Lab Name: ARDL, INC. Contract No.: 2424

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: X101

Matrix (soil/water) TCLP Lab Sample ID: 2424-1

Level (low/med): LOW Date Received: 09/19/96

% Solids: 0.0

Concentration Units: (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	25.0	U		P
7440-39-3	Barium	143	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	11400		E	P
7440-70-2	Calcium				NR
7440-47-3	Chromium	5.0	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	79300		E	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	50.0	U		P
7440-22-4	Silver	5.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

X102

Lab Name: ARDL, INC. Contract No.: 2424

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: X101

Matrix (soil/water) SOIL Lab Sample ID: 2424-2

Level (low/med): LOW Date Received: 09/19/96

% Solids: 53.8

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	98.0			P
7440-39-3	Barium	2250			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	1810			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	156		N	P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	53400		E	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	9.7			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	4.4	B	N E	F
7440-22-4	Silver	122			P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: SMALL ROCKS

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

X102

Lab Name: ARDL, INC. Contract No.: 2424

Lab Code: ARDL Case No.: SAS No.: SDG No.: X101

Matrix (soil/water) TCLP Lab Sample ID: 2424-2

Level (low/med): LOW Date Received: 09/19/96

% Solids: 0.0

Concentration Units: (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	25.0	U		P
7440-39-3	Barium	127	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	11200		E	P
7440-70-2	Calcium				NR
7440-47-3	Chromium	5.0	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	61900		E	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.22			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	50.0	U		P
7440-22-4	Silver	5.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

X103

Lab Name: ARDL, INC. Contract No.: 2424

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: X101

Matrix (soil/water) SOIL Lab Sample ID: 2424-3

Level (low/med): LOW Date Received: 09/19/96

% Solids: 54.3

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	89.8			P
7440-39-3	Barium	2570			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	2960			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	77.5		N	P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	72800		E	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	8.7			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	1.8	B	N E	F
7440-22-4	Silver	86.2			P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: SMALL ROCKS

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

X103

Lab Name: ARDL, INC. Contract No.: 2424

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: X101

Matrix (soil/water) TCLP Lab Sample ID: 2424-3

Level (low/med): LOW Date Received: 09/19/96

% Solids: 0.0

Concentration Units: (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	25.0	U		P
7440-39-3	Barium	108	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	11500		E	P
7440-70-2	Calcium				NR
7440-47-3	Chromium	5.0	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	36300		E	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.25			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	50.0	U		P
7440-22-4	Silver	5.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Chain o dy Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD Environmental	Project	Chemetco
Address	2020 YALE Blvd	Contact Person	Cindy Davis
City, State, Zip	Springfield, IL 62703	P. O. #/ Invoice to:	Chemetco
Phone Number	217/522-4085	Facsimile Number	217/522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling Date	Sampling Time	Container Size	Container No.	Preservative	Analysis Requested	PAS Sample Number
[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]	[redacted]	[redacted]
zinc oxide	soil	7/23/97	2:30		2	none	Flash, % solids, paint filter, total & reactive cyanides*, total & reactive sulfides* total phenol, E.O.X., volatiles → see attached, BASE NUETRALS (see attached)	4140

Relinquished by: [signature]		Received by: [signature]	
Date: 7/23/97	Time: 3:35 P.M.	Date: 7-23-97	Time: 1535 hrs
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-184

Form PASCOC1

Analytical Requirements

I. pH
Flashpoint (>200)
% Solids
Paint Filter
Bulk Density
* Total and Reactive Cyanides
* Total and Reactive Sulfides
Total Phenol
Extractable Organic Halogen (E.O.X.)

* Reactives only need to be run if totals are >10 ppm.

II. Total and TCLP Metals (TCLP's require matrix spike confirmation):

Arsenic	Total Metals required if the % solids is greater than 90%.
Barium	
Cadmium	
Chromium	IF HAZARDOUS FOR METALS, PDC IS REQUIRED
Lead	TO RUN A TREATABILITY STUDY TO DEMONSTRATE
Mercury	COMPLIANCE WITH LDR'S
Selenium	
Silver	

III. TCLP BNA's & TCLP VOA's
(i.e. D018-D043 Matrix spike confirmation required)

VOLATILES:
EPA Method 8260

Vinyl Chloride ✓
1,1-Dichloroethene ✓
Chloroform ✓
1,2-Dichloroethane ✓
Carbon Tetrachloride ✓
Trichloroethene ✓
Benzene ✓
Tetrachloroethene ✓
Chlorobenzene ✓
1,4-Dichlorobenzene ✓
2-Butanone (MEK) ✓

BASE/NEUTRAL/ACID EXTRACTABLES:
EPA Method 8270

Base/Neutrals
Pyridine ✓
Hexachloroethane ✓
Nitrobenzene ✓
Hexachlorobutadiene ✓
2,4-Dinitrotoluene ✓
Hexachlorobenzene ✓

Acids
m,p-Cresol ✓
o-cresol ✓
2,4,6-Trichlorophenol ✓
2,4,5-Trichlorophenol ✓
Pentachlorophenol ✓

IF THE WASTE CARRIES ANY HAZARDOUS WASTE CODES (SUCH AS F001, F019, ETC...) THE WASTE MUST BE ANALYZED FOR ANY BDAT STANDARDS LISTED FOR THAT HAZARDOUS WASTE CODE

MUST BE ON SIGNED LABORATORY LETTERHEAD

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD EnvironmentalServices, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 22 July 1997
Date Received: 23 July 1997
Date Analyzed 25 July 1997
Date Reported: 28 July 1997

Project: Chemetco

PAS Project Code: CSD-184

Sample Description: Zinc Oxide

PAS Sample No.: 9707234140

TCLP Organic Analysis

Parameters	Detection Limit mg/l	Result mg/l	E.P.A. Method	STORET Number	Regulatory Limit mg/l
Benzene	0.020	<0.020	8260A	99128	0.500
Carbon Tetrachloride	0.012	<0.012	8260A	99050	0.500
Chlorobenzene	0.020	<0.020	8260A	99096	100.0
Chloroform	0.005	<0.005	8260A	99149	6.00
O-Cresol	0.010	<0.010	8270B	99150	200.0
M-Cresol	0.010	<0.010	8270B	99151	200.0
P-Cresol	0.010	<0.010	8270B	99152	200.0
Total Cresols	0.010	<0.010	8270B	99153	200.0
1,4-Dichlorobenzene	0.010	<0.010	8270B	99154	7.50
1,2-Dichloroethane	0.003	<0.003	8260A	99155	0.50
1,1-Dichloroethylene	0.013	<0.013	8260A	99156	0.70
2,4-Dinitrotoluene	0.010	<0.010	8270B	99157	0.13
Hexachlorobenzene	0.010	<0.010	8270B	99159	0.13
Hexachlorobutadiene	0.010	<0.010	8270B	99160	0.50
Hexachloroethane	0.010	<0.010	8270B	99161	3.00
Methl Ethyl Ketone	0.020	<0.020	8260A	99060	200.00
Nitrobenzene	0.010	<0.010	8270B	99062	2.00
Pentachlorophenol	0.050	<0.050	8270B	99064	100.00
Pyridine	0.010	<0.010	8270B	99066	5.00
Tetrachloroethylene	0.003	<0.003	8260A	99068	0.70
Trichloroethylene	0.012	<0.012	8260A	99076	0.50
2,4,5-Trichlorophenol	0.010	<0.010	8270B	99078	400.00
2,4,6-Trichlorophenol	0.010	<0.010	8270B	99080	2.00
Vinyl Chloride	0.018	<0.018	8260A	99162	0.20

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

Project: Chemetco

PAS Project Code: CSD-184

Sample Description: Zinc Oxide

PAS Sample No.: 9707234140

Miscellaneous

Parameters	Detection Limit mg/kg	Result mg/kg	E.P.A. Method	STORET Number	Regulatory Limit mg/kg
Cyanide, Total	1.0	<1.0	9010	00720	250.0
Sulfide, Total	1.0	<1.0	9030	00722	500.0
Phenolics, Total	1.0	<1.0	9065	99120	1000.0
EOX	10.0	<10.0	9023	99143	1000.0
pH (Units)	—	7.0	9040A	00400	2.0<pH<12.5
Flashpoint (°F)	—	>200°	D92	—	>140
Paint Filter	—	Pass	9095	—	No Free Liquids
% Total Solids	—	83.5%	D2216	—	—

Stephen R. Johnson, Laboratory Director

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Form PAS-TCLP

PRINTED WITH SOY INK

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Sequence No.: 072597
Sample Spiked: 9707234139
Sample Duplicated: 9707234139
Date Reported: 28 July 1997

Project: Chemetco

PAS Project Code: CSD-184

Organic Analysis QAQC

Analytes	Amount Spike ug/l	Spike Result ug/l	Spike Recov ug/l	SD Result ug/l	SD Recov ug/l	RPD
Benzene	25	25	100	26	104	3.9
Carbon Tetrachloride	25	24	96	24	96	0.0
Chlorobenzene	25	23	92	25	100	8.3
Chloroform	25	22	88	21	84	4.7
o-Cresol	25	24	96	25	100	4.1
m-Cresol	25	25	100	23	92	8.3
p-Cresol	25	21	84	25	100	17.3
1,4-Dichlorobenzene	25	22	88	23	92	4.4
1,2-Dichloroethane	25	23	92	20	80	13.9
1,1-Dichloroethylene	25	23	92	24	96	4.3
2,4-Dinitrotoluene	25	23	92	25	100	8.3
Hexachlorobenzene	25	24	96	23	92	4.3
Hexachlorobutadiene	25	22	88	21	84	4.7
Hexachloroethane	25	23	92	21	84	9.1
Methyl Ethyl Ketone	25	24	96	22	88	8.7
Nitrobenzene	25	23	92	24	96	4.3

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Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

Pentachlorophenol	25	18	72	20	80	10.5
Pyridine	25	19	76	22	88	7.1
Tetrachloroethylene	25	705	108	708	120	10.5
Trichloroethylene	25	22	88	23	92	4.4
2,4,5-Trichlorophenol	25	23	92	24	96	4.3
2,4,6-Trichlorphenol	25	23	92	24	96	4.3
Vinyl Chloride	25	22	88	21	84	4.7

Stephen R. Johnson

Stephen R. Johnson, Laboratory Director

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Form-ORGQAQC

Prairie Analytical Systems, Inc.
An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Sequence No.: 072597
Sample Spiked: 9707234139
Sample Duplicated: 9707234139
Date Reported: 28 July 1997

Project: Chemetco

PAS Project Code: CSD-184

Metal Analysis QAQC

Analytes	Amount Spiked ug	Sample Result ug	Duplicate ug	Spike ug	% Spike Recovery	RPD
Arsenic	2000	--	--	2200	94	0.0
Barium	2000	250	250	2050	90	0.0
Cadmium	2000	1240	1240	3290	102	0.0
Chromium	2000	--	--	2000	100	0.0
Lead	2000	40300	45200	42150	93	0.0
Mercury	25	--	--	23.2	92.8	0.0
Selenium	2000	--	--	2100	105	0.0
Silver	2000	--	--	2000	100	0.0

Stephen R. Johnson, Laboratory Director

MATERIAL PROFILE

COMPANY NAME:	Chemetco, Inc.	EPA I.D. #:	ILD048803809
STREET ADDRESS:	Route 3 and Chemetco Lane		
CITY-STATE-ZIP:	Hartford, Illinois 62048		
CONTACT NAME:	Michelle Reznack	PHONE:	618-254-4381, Ext. 219
		FAX:	618-254-0138

MATERIAL CHARACTERIZATION

NAME OF MATERIAL: Crude Zinc Oxide
PHYSICAL STATE: Wet Sludge
% SOLIDS: 70-75% % MOISTURE: 25-30%
FREE LIQUIDS: None present
FLASHPOINT: > 200°C
MSDS AVAILABLE: Yes

CHEMICAL ANALYSIS (Weight percent unless indicated otherwise):

NICKEL	.2-.3%	CALCIUM	.8-1.5%	SULFATE	<1%
COBALT	<.1%	SODIUM	.5-1.0%	FLUORIDE	<.3%
CHROMIUM	<.1%	PLATINUM	NA	CHLORIDE	1.5-2%
COPPER	4-6%	PALLADIUM	NA	OTHERS	
ZINC	30-40%	GOLD	NA	All assays on a dry	
IRON	1.3-1.9%	SILVER	.010-.020%	weight basis.	
VANADIUM	<.1%	LEAD	15-20%	TIN	2.5%
CADMIUM	.25-.30%	AMMONIA	0		
CYANIDE	0	SILICA	4-6%		
pH	8-11	SP. GRAVITY	1.15 g/ml (wet)		
ORGANICS	Carbonates				

To the best of our knowledge, the material does not contain:

- cyanides,
- PCB's,
- explosives,
- pyrophorics,
- sulfides,
- asbestos,
- poisons,
- pesticides/herbicides,
- phenolics,
- chlorinated hydrocarbons.

The only known or suspected carcinogens include cadmium and nickel.

PROCESS GENERATING THE MATERIAL:

Pyrometallurgical copper refining. Zinc is volatilized and blown out of the copper bath by the use of oxygen and air. The gases are cleaned by a wet scrubber system. Caustic is added to neutralize the slurry water and force precipitation of metals.

REGULATORY CLASSIFICATION OF MATERIAL:

U.S.EPA HAZARDOUS WASTE:	No
IEPA HAZARDOUS WASTE:	No

ACCORDING TO U.S.EPA REGULATIONS, (40CFR), THIS MATERIAL IS A **BY-PRODUCT**.

SHIPPING INFORMATION:

DOT INFORMATION

HAZARDOUS MATERIAL:	**No**
HAZARDOUS MATERIAL NAME:	**Environmentally Hazardous Substance, n.o.s.**
HAZARD CLASS:	**9**
REPORTABLE QUANTITY:	**1 POUND**
U.N. #:	**3077**
ORM #:	**ORM-E**
PLACARD REQUIREMENT:	CLASS 9 PLACARD [redacted]
SHIPPING LABEL:	**No**
WASTE MANIFEST REQUIRED:	**No**
PACKAGING:	**Bulk preferably, however bags or boxes are O.K.**
OTHER:	**Membrane Press dewatered filter cake with the consistency of wet modeling clay.**

MATERIAL SAFETY DATA SHEET

I. PRODUCT IDENTIFICATION

Product name: CRUDE ZINC OXIDE

Manufacturer's name: CHEMETCO, INC.

Address: ROUTE 3 AND OLDENBURG RD.

HARTFORD, ILL. 62048

Telephone No.: (618)-254-4381

II. HAZARDOUS INGREDIENTS

NAME	%	CAS #	OSHA PEL	ACGIH TLV
ZINC OXIDE	34-40	1344132	5mg/cu.m	5mg/cu.m
LEAD OXIDE	12-17	1309600	0.05mg/cu.m	0.15mg/cu.m
TIN OXIDE	1-3	7440315	0.1mg/cu.m	0.1mg/cu.m
COPPER OXIDE	5-7	1317391	1mg/cu.m	1mg/cu.m
CADMIUM OXIDE	< .5	1306190	0.02mg/cu.m	0.05mg/cu.m
SILVER OXIDE	< .2	20667123	0.01mg/cu.m	0.01mg/cu.m
IRON OXIDE	< 2	1309371	10mg/cu.m	5mg/cu.m
NICKEL OXIDE	< .4	1314063	0.1mg/cu.m	0.1mg/cu.m
SODIUM HYDROXIDE	< 1	1310732	2mg/cu.m	2mg/cu.m
POTASSIUM CHLORIDE	< 1	7447407	N/A	N/A
CALCIUM OXIDE	< 2	1305788	5mg/cu.m	5mg/cu.m
WATER (Moisture)		BALANCE		

III. PHYSICAL CHARACTERISTICS

Boiling point: 1970 C

Melting point: 1560 C

Specific gravity: 1.34

Reactivity in water: NONE

Solubility in water: INSOLUBLE

Appearance and odor: GREY MUD-LIKE SUBSTANCE WITH ITS OWN DISTINCT ODOR

IV. FIRE AND EXPLOSION DATA

NON FLAMMABLE

NON EXPLOSIVE

V. REACTIVITY DATA

NON REACTIVE AS A WHOLE. MATERIAL AS A WHOLE IS STABLE.

MATERIAL WILL NOT DECOMPOSE OR POLYMERIZE

VI. HEALTH HAZARD DATA

MATERIAL CONTAINS TOXIC SUBSTANCES. MINOR IRRITATION WILL OCCUR IF PROLONGED CONTACT WITH THE SKIN. USE PERSONNAL PROTECTIVE GEAR WHEN HANDLING. (SEE SECTION VIII)

***** NICKEL AND CADMIUM COMPOUNDS HAVE BEEN IDENTIFIED AS POTENTIAL HUMAN CARCINOGENS *****

VII. SPILL AND LEAK PROCEDURES

PREVENT OTHER PEOPLE FROM WALKING ON SPILLED MATERIAL AND CARRYING IT AWAY OR SPREADING IT.

SHOVEL SPILLED MATERIAL INTO PLASTIC CONTAINERS OR BAGS.

CLEAN AREA WITH WATER AND CONTAIN THE WATER USED FOR CLEAN-UP. DISPOSE WATER ACCORDING TO LOCAL AND FEDERAL RULES AND REGULATIONS.

VIII. SPECIAL PROTECTION INFORMATION

RUBBER BOOTS

RUBBER GLOVES

FULL-BODY WORKING UNIFORM

RESPIRATOR IF WORKING IN AN OXYGEN DEFFICIENT AREA

SPLASH-PROOF SHIELD OR GOGGLES

** The information herein is given in good faith, but no warranty, expressed or implied, is made.

Attachment 2
Notices and Certifications

Notice and Certification to be sent to the IEPA for Wastes that No Longer Exhibit a Characteristic and are Sent to a Subtitle D Facility

---

Beginning on _______________, shipment of wastes which formerly exhibited one or more characteristics of a hazardous waste was made from "Chemetco" to _________ Landfill. At the time of shipment, the waste no longer exhibited a characteristic of hazardous waste.

Originating Facility **Receiving Facility**

The characteristic waste as initially generated had the following EPA hazardous waste number (s), belonged in the following treatability group and subcategory, and contained the underlying hazardous constituents (as defined in 35 Ill. Adm. Code 728.102(l)) as identified on the attached Figure 3.19(c). The wastes were treated onsite to remove the hazardous characteristic and to treat underlying hazardous constituents to levels in Sections 728.148 and 728. Table U.

Hazardous Waste Number before Treatment	Treatability Group and subcategory	Underlying Hazardous Constituents
D006	Cadmium, non wastewater	This waste contains underlying hazardous constituents as identified on the attached Figure 3.19(c). The waste meets the treatment standards for the underlying hazardous constituents (see certification on second sheet of this form)
D008	Lead, non wastewater	This waste contains underlying hazardous constituents as identified on the attached Figure 3.19(c). The waste meets the treatment standards for the underlying hazardous constituents (see certification on second sheet of this form)

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification. Based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 35 Ill. Adm. Code, Subpart D and all applicable prohibitions set forth in 35 Ill. Adm. Code 728.132 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

_____________________________ _________________________

Authorized Signature Title

____

Date

In addition to the above applicable certification, for characteristic wastes that have been treated onsite to remove the characteristic and to meet the universal treatment standards in 40 CFR 268.48 for all underlying hazardous constituents, the following certification is required.

I certify under penalty of law that the waste has been treated in accordance with the requirements of 35 Ill. Adm. Code, 728.140 to remove the hazardous characteristic and that underlying hazardous constituents, as defined in 35 Ill. Adm. Code, 728.102, have been treated onsite to meet the Sections 728.148 and 728.Table U. Universal Treatment Standards. I am aware that there are significant penalties for submitting false certification, including the possibility of fine and imprisonment.

__________________________ Authorized Signature Chemetco	______________________ Title

____

Date:________________________

One-Time Notice and Certification from Chemetco to the Disposal Facility for Initial Shipment of Wastes Meeting the Land Disposal Treatment Standards

---

The wastes identified on manifest number ________ and bearing the EPA hazardous waste number D006 and D008 are subject to the land disposal restrictions of 35 Ill. Adm. Code Part 728. The waste comply with the treatment standards specified in Part 728, Subpart D. The required information applicable to each waste is identified below:

Hazardous Waste Numbers before Treatment	Treatability Group	
D006	Non wastewater	0.11 mg/l TCLP
D008	Non wastewater	0.75 mg/l TCLP

NOTE* THIS WASTE STREAM HAS BEEN TREATED TO MEET THE LDR RESTRICTIONS.

A waste analysis for these wastes has been previously submitted to____________________. for pre-acceptance of this waste stream.

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information. I believe the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 35 Ill. Adm. Code, Subpart D and all applicable prohibition set forth in 35 Ill. Adm. code 728.132 or 728.139 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

______________________________ ______________________________

Authorized Signature Title
Chemetco

CSD Environmental Services, Inc.

CHEMETCO, INC.
1198010003--MADISON COUNTY
ZINC OXIDE SPILL
REMEDIATION PLAN

PREPARED FOR:

Chemetco, Inc.
Hartford, Illinois
1198010003 -- Madison County

APRIL 1997

RESPONSE TO #17

2220 Yale Blvd., Springfield, IL 62703 · Phone 217-522-4085 · FAX 217-522-4087

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ATTACHMENTS

FIGURES

CHEMETCO, INC.
1198010003 – MADISON COUNTY
REMEDIATION PLAN FOR ZINC OXIDE SPILL AREA
PHASE I - MATERIAL REMOVAL
APRIL, 1997

1.0 Introduction

A spill of zinc oxide was reported by Chemetco, Inc. (Chemetco) to the National Response Center and the Illinois Emergency Management Agency on September 19, 1996. The spill was found during a routine RCRA inspection conducted by the Illinois Environmental Protection Agency (IEPA) on September 18, 1996. Personnel from the United States Environmental Protection Agency (USEPA) were also present during the inspection. During the inspection, material that appeared to be zinc oxide was discharging from a pipe located south of Oldenburg Road. Sample results confirmed the spilled material was zinc oxide.

The IEPA has requested a RCRA closure plan be submitted for the spill area. In the course of negotiation, Chemetco has agreed to close the area in accordance with RCRA closure protocol. Submittal of this plan is not in any way an admission of Chemetco's behalf that the spill area is subject to RCRA requirements. The spill remediation plan will be submitted in two phases. Phase I will discuss Material Removal. Phase II will focus on Demonstration of "Clean Closure". This plan addresses Phase I - Material Removal.

2.0 Facility Description

The Chemetco facility was constructed in 1969 and commenced production of anode copper, cathode copper, crude lead-tin solder, zinc oxide and slag in 1970. The Chemetco facility is located within a primarily agricultural, light residential area south of Hartford and is bounded on the west by major, heavily traveled rail and highway routes and on the south by a limited use secondary road. More specifically, the 200+ acre plant site is in the Southeast 1/4, Section 16, Township 4 North, Range 9 West of the Third Principal Meridian, in Madison County (see Figure 2-1).

2.1 Facility Address and Identification Numbers

Chemetco, Inc.
Route 3
Hartford, IL
IEPA #1198010003
USEPA # ILD048843809

2.2 Description of Spill Area

The spill was discovered during an IEPA inspection on September 19, 1996. CSD Environmental was retained on September 20, 1996 by Chemetco to conduct remediation of the spill area. During excavation activities layers of zinc oxide material were found to a depth of 6 feet in Long Lake indicating the area appeared to be impacted from historical management of zinc oxide.

This remediation plan addresses source removal of zinc oxide from a spill area approximately 300 feet long by 450 feet wide. Initially the spill area was reported to be approximately 600 feet wide, however, the area has now been surveyed and confirmed to be only 450 feet wide. To contain the spill, four separate containment areas were constructed within the impacted area. Containment Area # 1 contains the zinc oxide removed from the other three containment areas. Containment Area #1 measures approximately 200 x 370 feet and has approximately 3,000 to 5,000 cubic yards of zinc oxide stored within it. Containment Area #2 measures approximately 300 x 50 feet (initially reported as 90 feet) and was constructed to temporarily hold diverted water from a portion of Long Lake. Approximately 575,000 gallons of water is estimated to be stored in Containment Area #2. Containment Area #3 measures 250 x 200 feet. Zinc oxide was removed from Containment Area #3 and was placed into Containment Area #1. Containment Area #4 measures 200 x 300 feet and was not affected by the spill to the degree that the other containment areas were. Any visible zinc oxide found in Containment Area #4 was placed into Containment Area #1. Debris in the form of tree stumps and rock is stockpiled in Containment Area #4. Refer to Figure 2-2 for the spill location and the containment areas.

3.0 Overview of Removal Procedures Completed

A work plan for the immediate response to the spill was submitted by CSD Environmental Services, Inc. (CSD) to the Illinois EPA on September 25, 1997. On September 30, 1997, the IEPA responded to the plan requesting additional information. A revised work plan was submitted on October 10, 1996 addressing their concerns. Attachment 1 contains a copy of the October 10, 1996 Revised Work Plan. The Work Plan addressed temporary containment and removal of the zinc oxide from Containment Area #3.

The spill area was inspected by CSD Environmental to evaluate the best options for remediation. Visual criteria was used to delineate the extent of the spill area. Initially a diversion channel was constructed to reroute the lake past the spill area. A Section 404 Permit, of the Clean Water Action (CWA), was received by the Army Corp of Engineers (Corp) to build a diversion channel and two dams on Long Lake. Attachment 2 contains a copy of the permit and permit application received from the Corp.

3.1 Containment

The following items were constructed to achieve containment of the spill area:

- A road was constructed using limestone rock to allow heavy equipment and trucks access to the spill area. The road was advanced over impacted soil and will be removed to enable soil remediation after the zinc oxide from Containment Area #1 is removed. The north side of the road was lined with a 8 to 10 millimeter thickness polyethylene plastic to inhibit water from flowing under the dam. Limestone rock was placed on top of the liner to hold it in place.

- An earthen berm approximately 3 to 5 feet in height was constructed around the entire perimeter of the spill area. Surface water was diverted around the impacted area through a drainage ditch.

- A diversion channel 25 feet wide and 3 to 5 feet in depth was constructed to reroute water in Long Lake around the spill area. Two dams were constructed on Long Lake to assist in the diversion.

3.2 Dewatering

To remove the zinc oxide from Long Lake (Containment Area #3), dewatering was required. An impoundment was constructed within the contained spill area to hold water pumped from Containment Area #3. Prior to constructing the impoundment, any visual zinc oxide within the area was pushed with a bulldozer to the southwest corner of the spill area. An impoundment approximately 300 feet long by 50 feet wide was constructed. This impoundment was labeled Containment Area #2. The construction of Containment Area #2, in effect created two additional containment areas within the larger bermed area, Containment Areas #1 and 4. Containment Area #1 contained the largest percent of zinc oxide from the spill, therefore it was decided this area would be best suited to contain the zinc oxide to be removed from Long Lake. Containment Area #4 was not as significantly impacted from the spill as the other others. Containment Area #4 was used for storing vegetation removed from the spill area and rock removed from the temporary pads constructed within Long Lake to allow equipment access. The portion of Long Lake to be dewatered and remediated was labeled Containment Area #3. Refer to Figure 2-2 for the spill locations and the containment areas.

3.3 Zinc Oxide Removal from Containment Area #3 (Long Lake)

The water from Containment Area #3 was transferred to Containment Area #2 using portable trash pumps. Two pads were constructed of limestone rock on the north side of Long Lake to allow the trackhoe access to the south side of the lake. All vegetation and debris (logs) within Long Lake were removed and stockpiled within Containment Area #4 for further handling. After the vegetation was removed and the dewatering was completed, excavation of impacted soils was initiated. Visual criteria was used to determine the initial excavation depth. Visual inspection of the soil revealed the zinc oxide extended to a depth of approximately 6 feet indicating the area was impacted from historical management of zinc oxide. Three sediment samples were collected after the initial excavation to determine if additional excavation was necessary. Refer to Figure 3-1 for the location of the sediment samples. Table 1 summarizes the analytical results. Copies of the analysis are provided in Attachment 3.

3.4 Vegetation Removal

To remove the zinc oxide from the impacted area, it was necessary to remove standing and fallen trees to allow equipment access to the area. The trees removed were cut down with chain saws above the roots. If visible zinc oxide was detected on the tree, the cut was made above the visual point. The trees were fed through a large tub grinder for shredding. The shredded material was stockpiled in Containment Area #4 for further handling. The tree roots were removed by excavation and also placed in Containment Area #4. See Section 5.3 for information regarding removal of these items. The tub grinder was decontaminated using a high pressure steam wash before leaving the job site. All decontamination waters were containerized in a 475 gallon polyethylene tank and transferred to Containment Area #2, pending future on-site treatment. Refer to Section 5.2.

Table 1
Soil Samples - Long Lake - After Initial Excavation
October 9, 1997
Chemetco, Inc.

Sample Number: Parameter:	Long Lake 1	Long Lake 2	Long Lake 3
Total Metal Analysis in mg/kg			
Cadmium	56.3	8.3	16.1
Lead	27.1	75.5	333
Zinc	519	498	716
TCLP Metal Analysis in mg/l			
Cadmium	<0.004	<0.004	1.3
Lead	<0.042	<0.042	10.4
Zinc	4.5	4.9	77.1
IEPA Clean Up Objectives			
Cadmium	0.005		
Lead	0.0075		
Zinc	5.0		

Clean up objectives as proposed in Title 35: Environmental Protection: Subtitle G: Waste Disposal: Chapter I; Pollution Control Board; Subchapter F: Risk Based Cleanup Objectives; Part 742 - Tiered Approach to Corrective Action Objectives; Class I - Migration to Groundwater Route Values. Those TCLP values exceeding the objectives are highlighted. No objectives are identified for total metal values.

The sample results confirmed the visual criteria used to determine the initial excavation depth was an excellent indicator to identify the extent of contamination. Additional excavation was conducted in the area of sample 3. The temporary pads constructed to allow access across Long Lake were removed and stockpiled in Containment Area #4.

A Sampling and Analysis Plan was submitted to the IEPA on October 10, 1996. The sampling and analysis plan identified the sample locations and sampling parameters to determine closure. The plan was verbally approved by the IEPA on October 21, 1996. Refer to Attachment 4 for a copy of the Sampling and Analysis Plan.

Photographs documenting the containment of the spill area, construction of containment area #2 and removal of the zinc oxide from Containment Area #3 (Long Lake) are provided as Attachment 5.

4.0 Sampling and Analysis of Containment Areas 3 and 4

Sampling of Containment Area # 3 and a partial area of Containment Area #4 was conducted on October 23, 1996. Sampling was conducted in accordance with the approved Sampling and Analysis Plan except for the following changes:

- The area of Containment #3 was measured and found to be 28,600 ft^2 instead of 50,000 ft^2 . The grid interval was changed to 50 feet to account for the decrease in the square footage.

- Sampling was conducted using a skid loader and five foot stainless steel split spoon samplers where possible. The original sampling and analysis plan indicated sampling would be conducted using a hand auger. The use of the split spoons allowed for a five foot sample to be collected at each sample location. Three split spoons were used to speed in sample collection. Each split spoon was decontaminated between samples by washing with alconox, followed by steam cleaning and finally a tap water rinse.

Sampling began with CSD Environmental and Western Environmental personnel establishing the grid interval and marking each grid node with a construction stake. Each grid node was given a sample number identifying the sample location. Numbering corresponded to the Containment Area. For example, all samples from Containment Area #3 were identified as CA-3-#. Samples from Containment Area #4 were identified as CA-4-#. Samples were collected to demonstrate closure from Containment Areas 3 and 4. Only a portion of Containment Area #4 was sampled since the remainder of the area was flooded. Samples will be collected from Containment Areas 1, 2, and the remainder of 4 when the zinc oxide and water within containment is removed. Samples were collected at depths of 6" and 18" below grade from all sample locations. In addition, at the request of the IEPA, samples from a depth of five feet were collected at three locations within Containment Area #3; CA3-3; CA3-4 and CA3-7. Figure 4-1 indicates the sample locations. The skid loader was not able to reach sample locations 6 and 9 within Containment Area #3 therefore, samples CA3-6 and CA3-9 were collected using a hand auger. The depth of the augured hole was measured with a tape measure to ensure samples were collected from the correct depths. Decontamination procedures of the hand auger were identical to those of the five foot split spoons.

Each sample was placed into laboratory provided glass jars. The jars were labeled indicating the sample location and depth, company name, and samplers initials. The jars were immediately placed into a pre-chilled cooler of approximately 4 degrees C. Each cooler was provided with a chain of custody form. The samples were hand delivered to Prairie Analytical Systems, Inc. in Springfield, Illinois by CSD personnel within 24 hours of sample collection.

All rinse waters used for decontamination were captured and containerized into a 475 gallon polyethylene tank. The rinse waters were transported to Containment Area #2 pending future on-site treatment. Refer to Section 5.2.

4.1 Analytical Results - Containment Area #3

Table 2 summarizes the sample results collected from Containment Area 3. The sample results from Containment Area #3 indicate the majority of the zinc oxide was removed. Analytical results are provided in Attachment 6. Only one sample, CA3-7 collected from a depth of 6" exceeded the clean up objective of 5 mg/l for Zinc. Zinc was detected at 8.1 mg/l in this location, however, the deeper sample collected at 18" from only detected zinc at 0.21 mg/l. Lead was detected in one location, CA3-1-6" at 0.012 mg/l above the detection limit of 0.0075 mg/l. The deeper sample collected at 18" from CA3-1 detected lead at <0.001 mg/l. Cadmium was detected above the detection limit of 0.005 mg/l in seventeen of the twenty two samples; at the detection limit in two samples; and less than the detection limit in three samples. The highest level of cadmium detected was at 0.48 mg/l in sample CA3-7-6". Most of the exceedences of the cadmium standard were within fifteen parts per million of the standard. Chemetco proposes to use Tier 2 and if necessary, Tier 3 of the Tiered Approach to Clean Up Objectives to establish site specific clean up objectives. Phase II of Remediation - Demonstration of Clean Closure will contain the Tier 2 and 3 Analyses.

4.2 Analytical Results - Containment Area #4

Table 3 summarizes the sample results from Containment Area #4. Seven samples exceeded the clean up objective of 0.005 mg/l for Cadmium; two samples exceeded the objective of 0.0075 mg/l for lead; and four samples exceeded the objective of 5.0 mg/l for Zinc. The highest exceedence for Cadmium at 0.107 mg/l was found at CA4-4 at a depth of 18". The highest exceedence for Lead at 0.472 was found at CA4-4 at 6" in depth. The highest exceedence for Zinc at 11.7 was found at CA4-4 at 6" in depth. Chemetco proposes to use Tier 2 and if necessary, Tier 3 of the Tiered Approach to Clean Up

Objectives to establish site specific clean up objectives. Phase II of Remediation - Demonstration of Clean Closure will contain the Tier 2 or 3 Analysis. If it is determined after the Tier 2 or 3 analyses is conducted that the soil samples still do not meet the objectives, additional soil removal or stabilization in place may be conducted.

Table 2
Soil Sample Results
Containment Area #3
Chemetco, Inc.
October 24, 1996

Sample Number	Cadmium mg/l	Lead mg/l	Zinc mg/l
Clean up Objective from 742: Table A	0.005	0.0075	5.0
CA3-1-6"	0.013	0.012	<0.002
CA3-1-18"	<0.001	<0.001	<0.002
CA3-2-6"	<0.001	<0.001	<0.002
CA3-2-18"	<0.001	<0.001	<0.002
CA3-3-6"	0.005	<0.001	0.04
CA3-3-18"	0.007	<0.001	<0.002
CA3-3-5'	0.020	<0.001	<0.002
CA3-4-6"	0.007	<0.001	<0.002
CA3-4-18"	0.005	<0.001	<0.002
CA3-4-26"	0.008	<0.001	<0.002
CA3-4-5'	0.007	<0.001	<0.002
CA3-5-6"	0.010	<0.001	<0.002
CA3-5-18"	0.036	<0.001	<0.002
CA3-6-6"	0.056	<0.001	<0.002
CA3-6-18"	0.061	<0.001	<0.002
CA3-7-6"	0.48	<0.001	8.1
CA3-7-18"	0.009	<0.001	0.21
CA3-7-5'	0.106	<0.001	1.32
CA3-8-6"	0.010	<0.001	<0.002
CA3-8-18"	0.010	<0.001	0.24
CA3-9-6"	0.029	<0.001	0.70
CA3-9-18"	0.047	<0.001	<0.002

Those TCLP values exceeding the objectives are highlighted.

Table 3
Soil Sample Results
Containment Area #4
Chemetco, Inc.
October 24, 1996

Sample Number	Cadmium mg/l	Lead mg/l	Zinc mg/l
Clean up Objective from 742: Table A	0.005	0.0075	5.0
CA4-1-6"	0.018	<0.001	<0.002
CA4-1-18"	<0.001	<0.001	<0.002
CA4-2-6"	0.048	<0.001	<0.002
CA4-2-18"	0.014	<0.001	0.53
CA4-3-6"	<0.001	<0.001	<0.002
CA4-3-18"	0.005	<0.001	<0.002
CA4-4-6"	0.053	0.472	0.16
CA4-4-18"	0.107	0.047	11.7
CA4-5-6"	<0.001	<0.001	3.97
CA4-5-18"	0.032	<0.001	<0.002
CA4-9-6"	0.014	<0.001	<0.002
CA4-9-18"	<0.001	<0.001	<0.002

Those TCLP values exceeding the objectives are highlighted.

5.0 Removal Procedures for Containment Areas 1 and 2

5.1 Containment Area #1

The zinc oxide and soil contained in Containment Area #1 (CA#-1) are recyclable materials due to level of lead, zinc and precious metals contained within. Chemetco currently ships zinc oxide as a by-product to ELMET in Berango Spain for further metal recovery. Chemetco is also currently negotiating with two additional customers for the sale of zinc oxide material. Chemetco intends to remove all the zinc oxide stored within Containment Area #1 and ship the material to either ELMET as a by-product or to Hydromet in Newman, Illinois as a hazardous waste. The characterization will be dictated by ELMET's specifications.

5.1.A. Characterization of the Zinc Oxide

To ensure the material will meet ELMET'S specifications, samples of the material were collected. A sampling grid consisting of 35 feet in the east - west direction and 40 feet in the north- south location was arranged. The south portion of the zinc oxide was estimated to be approximately 6 feet higher than the north portion, therefore, samples from the south side of CA#1 were collected at each grid interval from depths of 2, 4, and 8 feet. Samples were collected at a depth of 2 and 4 feet from the north portion. Refer to Figure 5-1 for sample locations. The samples were collected using a hand auger. Sample depth markings were placed on the extensions of the hand auger to ensure correct sampling depths. The samples were placed in one quart ziploc bags and delivered to MIDCO labs in St.

Louis, MO for metal assaying. The sample results will be sent to ELMET for pre-acceptance. If any of the samples are denied by ELMET, the zinc oxide from the corresponding sample location will be shipped as a hazardous waste under a manifest to Hydromet for reclamation.

5.1.B Removal Procedures

Prior to removal of any zinc oxide, the water in Containment Area #1 will be pumped into Containment Area #2 to initiate the drying process. No removal can occur until the water currently stored within Containment Area #2 is removed to allow room for the additional water from Containment Area #1. See Section 5.2 regarding water removal from Containment Area #2. Due to the moisture content of the material, three different removal procedures are documented below for the zinc oxide removal. Zinc oxide meeting ELMET's specifications will be transferred into barges. The barges will transport the material to either the Port of New Orleans or to Chicago where the zinc will be clamshelled into a ship for overseas transportation. Material deemed not acceptable to ELMET will be transported as a hazardous waste to Hydromet for reclamation.

1. The zinc oxide will be loaded "as is" into polyethylene lined trucks for transportation to either the Hartford Terminal or Hydromet.

2. The zinc oxide will be spread out in Containment Area #1 to allow natural drying of the material. Care will be taken to ensure the material is not over dried to become an air emission source. After drying, the material will be loaded into

polyethylene lined trucks and transported to either the Hartford Terminal or Hydromet.

3. If the material is found to need further dewatering prior to shipment, the material will be transported to Chemetco's ponds. The material will flow from the ponds to the settling cells and to the filter press for pressing. Refer to Figure 5-2 for a flow diagram of the material through the plant. After pressing the material will be loaded into polyethylene lined trucks and transported to either the Hartford Terminal or Hydromet.

5.2 Removal Procedures Containment Area #2

Containment Area #2 measures approximately 300 x 90 feet and was constructed to temporarily hold water from the diverted portion of Long Lake. Prior to constructing the impoundment, any visual zinc oxide within the area was pushed with a bulldozer to the southwest corner of the spill area. Approximately 575,000 gallons of water is estimated to be stored in Containment Area #2. A sample of the water contained within Containment Area #2 was collected on October 11, 1996 and analyzed for Chemetco's NPDES discharge parameters pursuant to Chemetco's NPDES Permit #IL0025747. Table 4 summarizes the analytical results. Exceedences of the General Use Standards were found for Cadmium, Copper, Iron, Manganese, Lead, Suspended Solids and Zinc. CSD verbally requested approval from the IEPA, Bureau of Water, on October 21,1996 for an emergency discharge of the water within Containment Area #2 to Long Lake. This request was denied by the IEPA, Bureau of Water on October 26, 1997. In response to the denial, CSD collected an additional sample of water from Containment Area #2 and analyzed for dissolved cadmium, copper, iron, lead, manganese and zinc. Sample results indicated after filtration cadmium, manganese and total suspended solids exceeded the general use standards. The sample results are provided in Table 5. On November 27, 1996, CSD submitted a letter requesting the Agency's assistant in discussing disposal options for the impounded water. The IEPA responded by letter on December 6, 1997 denying a provisional variance request for discharge of the water. In response to the IEPA's variance denial, a formal request for a variance to discharge the water after treatment was requested by Chemetco on March 20, 1997. A copy of CSD's November 27, 1996 letter, the IEPA response, and Chemetco's March 20, 1997 request for a variance is provided as Attachment 7. The IEPA denied the request for a provisional variance on March 31, 1997. A meeting was held with the Bureau of Water on April 9, 1997 to discuss the variance denial. The Bureau of Water requested CSD submit an NPDES application to discharge the water. CSD explained that due to time constraints we were requesting the variance to discharge the water. CSD informed the Bureau that CA#2 needed to be dewatered in order to begin zinc oxide removal in CA#1. The Bureau again refused the variance request. In response to the variance denial, an application for an NPDES permit to temporarily discharge the impounded water was submitted to the IEPA on April 16, 1997. If the NPDES request is approved by the IEPA, a temporary wastewater treatment unit will be mobilized to dewater Containment Areas #1, 2 and 4. Refer to the process description in Attachment 7 for a description of the proposed temporary treatment. If the Bureau of Water denies the NPDES permit request, CSD will request the Bureau of Water to allow treatment to be conducted after construction of the permanent wastewater treatment plant. Chemetco is currently submitting an NPDES permit application to construct and operate a permanent storm water treatment plan to treat all storm water at the plant. This application is anticipated for submittal by May 31, 1997.

To aid in drying and removal of zinc oxide in Containment Area #1 water will be pumped from Containment Area #1 to Containment Area #2. Containment Area #2 will continue to be used to store water until the zinc oxide material from Containment Area #1 is removed. If zinc oxide removal from CA#1 needs to begin before the

Table 4
Water Sample Result from Containment Area #2
Collected on October 11, 1996
Analyzed for NPDES Discharge Parameters
Total Metals

Parameter	Result in mg/l	General Discharge Standard
Silver	0.021	0.1
Boron	5.54	*
BOD	<7.5	30
Cadmium	0.563	0.15
Chlorine	<0.05	*
Copper	1.20	0.5
Iron	2.57	2.0
Hexane soluble Oil and Grease	11.5	15.0
Manganese	2.42	1.0
Nickel	0.14	1.0
Lead	1.59	0.2
Suspended Solids	67	15.0
Zinc	6.63	1.0

Those samples exceeding the General Use Standard as defined in 35 Ill. Adm. Code, Subtitle C, Part 304 are highlighted. * No standard has been established in 35 Ill. Adm. Code, Subtitle C, Section 304.

Table 5
Water Sample Result from Containment Area #2
Collected on October 28, 1996
Analyzed for NPDES Discharge Parameters
Dissolved Metal Analysis

Parameter	Result in mg/l	General Use Standard
Cadmium, diss	0.22	0.15
Copper, diss	0.136	0.5
Iron, diss	<0.007	2.0
Lead, diss	0.010	0.2
Manganese, diss	2.14	1.0
Zinc, diss	0.68	1.0
Total Suspended Solids	23	15
pH	8.53	6-9

Bureau of Water has granted an NPDES permit, CA#2 may need to be enlarged to the east to increase capacity.

5.3 Removal Procedures Containment Area #4

All visible zinc oxide was removed from Containment Area #4 and placed into Containment Area #1 at the time of construction of Containment Area #2. Debris in the form of tree stumps, shredded trees and rock is currently stored in Containment Area #4. Removal of each of these items is discussed below.

Tree stumps - A composite sample was collected from the soil held in the roots and sent to Prairie Analytical for analysis of TCLP lead, cadmium and zinc. The results indicated the zinc oxide held by the roots failed the TCLP test for all three parameters. Refer to Attachment 8 for a copy of the analytical results. The stumps will be handled in one of several manners. The stumps may be shaken and power washed to attempt to separate the zinc oxide from the roots. The soil removed will be collected and placed into Containment Area #1. After washing, the stumps will be fed through a grinder. A composite sample of the shredded materials will be collected for TCLP lead, zinc and cadmium. If the results indicate failure of the TCLP test, the material will either be disposed of as a hazardous waste at an approved facility, or assayed for recoverable metals content for acceptance at ELMET. If the material passes the TCLP test a special waste determination will be conducted to determine disposal options. Chemetco may alternatively shred the stumps as-is, and pre-qualify the materials for acceptance at ELMET or for off-site disposal.

Shredded trees - A composite sample of the shredded wood will be collected for analysis TCLP lead, zinc and cadmium. If the results indicate failure of the TCLP test, the material may be disposed of as a hazardous waste at an approved facility, or assayed for acceptance at ELMET. If the material passes the TCLP test a special waste determination will be conducted to determine disposal options.

Limestone Rock - the rock will be assayed for recoverable metals content for acceptance at ELMET. If ELMET denies acceptance of the rock, the materials will be placed on a shaker to remove as much excess soil as possible, followed by a power wash if necessary. Two composite samples will be collected from the rock for TCLP lead, zinc and cadmium. If the results indicate failure of the TCLP test, the material will be either be disposed of as a hazardous waste at an approved facility or washed further to remove the soil. If the material passes the TCLP test a special waste determination will be conducted to determine disposal options.

6.0 Proposed Sampling and Analysis to Demonstrate Clean Closure from Containment Areas 1, 2 and 4.

Sampling and analysis of the Areas #1, 2, and 4 will be conducted as described in Sections 6.1, 6.2 and 6.3 below. Phase II of the Remediation Plan - Demonstration of Clean Closure will be submitted within 90 days after all sampling is completed.

6.1 Sampling and Analysis Containment Area #1

Following removal of the zinc oxide material, the procedures outlined in CSD's Sampling and Analysis Plan dated October 10, 1996 will be followed except for the following:

Sampling will be conducted using a skid loader and five foot stainless steel split spoon samplers. Three split spoons will be used to speed sample collection. Each split spoon will be decontaminated between samples by washing with alconox , followed by steam cleaning, and finally a tap water rinse.

6.2 Sampling and Analysis Containment Area #2

Chemetco is submitting to the IEPA, Bureau of Water, an operating and construction permit for a permanent storm water treatment unit to be constructed on the south side of Oldenburg Road. The treatment unit will be placed north of the spill area. The storm water treatment unit will be capable of treating all storm water that falls on the plant. Chemetco currently uses water stored in the existing storm water impoundments for dust suppression of the yard. Chemetco proposes to leave Containment Area #2 in place to hold treated effluent from the wastewater treatment unit for storage of water for dust suppression.

To create Containment Area #2, all visible zinc oxide was pushed with the bulldozer to Containment Area #1. Containment Area #2 was constructed by pushing the native soils from the middle towards the sides to construct the berms. Containment Area #2 is approximately seven feet deep towards the middle. Chemetco proposes to sample the bottom and sidewalls of Containment Area #2 to demonstrate clean closure. This request is a slight modification from the Sampling and Analysis Plan submitted on October 10, 1996 due to Chemetco's desire to maintain use of the impoundment after zinc oxide removal activities are complete. Figure 6-1 contains a copy of the proposed sample locations and depths. Samples are proposed to be collected using stainless steel five foot split samplers to be advanced by either a skid loader or a drill rig. The samplers will be decontaminated between samples by washing with alconox , followed by steam cleaning, and finally a tap water rinse. Samples will be analyzed for the parameters identified in the Section 2.3 of the 10/10/96 Sampling and Analysis Plan. The remainder of the procedures as outlined in the Sampling and Analysis plan will be followed.

6.3 Sampling & Analysis of Containment Area 4

Following removal of zinc oxide in Containment Area #1 and disposal of the vegetation and debris stored in Containment Area #4 , sampling of the remainder of

Containment Area #4 will be conducted. A partial sampling of this area was conducted on October 23, 1996. Sampling will be conducted using the same procedures described in Section 6.1 for Containment Area #1.

7.0 Groundwater Monitoring Plan

The purpose of this proposed Phase I groundwater investigation, is to determine the absence/presence of hazardous constituents in the shallow perched aquifer related to the zinc oxide spill. Well installation will confirm or deny the existence of the shallow perched aquifer encountered during previous investigations at the facility north and east of the spill site as well as the subsurface characteristics.

7.1 Regional Geologic and Hydrogeologic Information

The Chemetco site is located in the floodplain of the Mississippi River in an area locally referred to as the American Bottoms. This area is characterized by relatively flat topography. The gradient of the Mississippi River in the American Bottoms is about 6 inches per mile or 9.5×10^{-5}. The land surface gradient over a similar area is about 12 inches per mile or 6.3×10^{-5} both of these gradients are extremely flat.

Precipitation to the American Bottoms falls on the flat surface and either infiltrates into the ground or evaporates. Because of the flat surface there is very little runoff. Recharge to the groundwater system in this area is received from the highlands surrounding the American Bottoms, infiltration from channels, and Mississippi River flood waters. Infiltration of water into the ground is restricted by the clay and silt layer found near the surface. Beneath the clay and silt layer lies the regional American Bottoms sand and gravel aquifer which extends to bedrock. The source of some recharge may be the bedrock aquifer near pumping centers. Under non-pumping conditions the regional groundwater flow in the American Bottoms aquifer is expected to be toward the west or southwest towards the Mississippi River.

The regional aquifer is generally greater than 90 feet thick and extends to the bedrock. Although there is not distinct boundary between the formations in the regional aquifer, the regional aquifer is considered here to be comprised of two distinct hydrogeologic units given the gradation from silty sand to coarse sand and gravel. The clean sand and gravel deposits in the bottom zone of the American Bottoms aquifer constitute the major water-producing zone in the area. These deposits are utilized as groundwater supplies for municipal and industrial withdrawals, including Chemetco. Figure 7-1.1 shows the groundwater divides created by the major pumping centers in the area of the Chemetco site (Kohlhase, 1987). In 1951 these pumping centers produced a maximum withdrawal of 110 million gallons per day (mgd). In 1985 the withdrawal rate had declined to about 60 mgd (Kohlhase, 1987).

The Illinois State Water Survey (Water Survey) conducts periodic water-level monitoring programs of selected wells in the American Bottoms aquifer. Utilizing this water-level data the Water Survey produces a potentiometric map of the aquifer. This potentiometric map shows that aquifer withdrawals have significantly changed the groundwater flow direction within the aquifer and the flow is directed towards the various pumping centers. Using the potentiometric map, the Water Survey has determined the approximate locations of groundwater divides between the pumping centers. These divides, whose exact locations change according to variations in recharge and withdrawal rates, delineate the approximate areas of influence of the pumping centers.

Figure 7-1.1. shows the groundwater divides determined by the Water Survey (Kohlhase, 1987). This figure shows that the Chemetco site is on the edge of the area of influence of the Poag pumping center. The Chemetco site is also located just south of the areas of influence of the Roxana and Wood River pumping centers. The regional mapping does not have sufficient delineation of the groundwater contours in the Chemetco site area to determine the regional direction of groundwater flow. The flow in this area, however, should be towards the Mississippi River.

Because of the prolific production of the American Bottoms aquifer, the limestone aquifer below the American Bottoms aquifer has not been tapped for groundwater supplies. It is believed, that the limestone aquifer could also be a source for high capacity production wells; water sampling in other areas has shown that this bedrock aquifer is highly mineralized.

7.1.1. Description of Class I Groundwater

The American Bottoms Aquifer as described in Section 7.1. and 7.2. is a Class I Groundwater pursuant to Ill. Admin. Code, Part 620.210.

7.1.2. Identification of Private/Potable Water Supply Wells

The Chemetco facility is located in a sparsely populated area. Consequently the number of withdrawal wells within a one (1) mile of the site is low. The only commercial/industrial are Chemetco's own wells. The well water is used for human consumption.

Well logs for ten (10) private wells within one (1) mile of the Chemetco facility were obtained from, State Agencies. Figure 7-1.2. indicates their locations in relation to the site. Several of the wells indicated in the figure are believed to be no longer in use. Through field investigations to be conducted concurrent with other field sampling activities, Chemetco will verify which wells remain in service in the area.

7.1.4. Identification of Units Beneath the Site Subject to Class I Standards

The American Bottoms Aquifer is subject to Class I standards as is any hydraulically connected unit. Therefore, the shallow perched aquifer, if encountered beneath the spill area, may also be subject to Class I groundwater quality standards.

7.1.5. Identification of the Source of All Municipal Water

The regional aquifer is reportedly a drinking water source downgradient of Chemetco; Hartford municipal wells are reportedly northwest of the facility. In addition, potable water for the Chemetco facility is drawn from the two facility water supply wells, screened in the lower regional aquifer.

7.2 Characterization of Geology

As previously stated, the purpose of this proposed Phase I groundwater investigation, is to determine the absence/presence of hazardous constituents in the shallow perched aquifer related to the zinc oxide spill. At this time it can only be assumed that the hydrogeologic/geologic conditions discussed below can be correlated from previously studied areas at this facility to the area beneath the zinc oxide spill. Well installation will confirm or deny the existence, as well as the characteristics, of a shallow perched aquifer.

Chemetco has conducted interim-status groundwater monitoring for units north of the zinc oxide spill area since January 1983. During related investigations, it has been determined that the general hydrogeology of the site consists of an aquitard that contains lenses of water-bearing sand and silt underlain by the regional American Bottoms sand and gravel aquifer. A cross-section is included as Figure 7-2.1. The aquitard contains a perched sand aquifer that outcrops to surface south of the facility as depicted in Figure 7-2.2.

The Chemetco facility is underlain by a clay and silty clay unit ranging from approximately 20 to 60 feet in thickness. Interbedded within the clay in the southeastern quadrant of the facility is a sand lense (also referred to as the perched sand aquifer). The perched sand aquifer extends from 5 to 20 feet below grade with a maximum thickness of 15 feet and is bounded above and below by the clay and silty clay. The hydraulic conductivity of the perched unit has been calculated from slug test data to be 2.8×10^{-3} cm/sec. The results of site investigations indicate that the water flows from north to south across the southeastern quadrant of the facility. Data indicate the water-bearing formation does not extend to the facility northern and western boundaries and stops within 300 feet of the southern and eastern boundaries. A second sand and silt lense has been identified, based on water level elevations, to the east of well 12.

The clay layer averages 10 feet in thickness beneath the shallow perched zone and increases to 25 feet in thickness in the northern portions of the Chemetco facility (where the perched sand aquifer is not present). The hydraulic conductivity of the clay layer based on slug test data indicate a hydraulic conductivity of 4.6×10^{-5} cm/sec which is two or more orders of magnitude lower than the aquifers and therefore constitutes an aquitard.

Beneath the clay is a layer of fine to silty sand that grades to coarse sand with depth and finally to sand and gravel. This unit is the regional American Bottoms Aquifer. The regional aquifer is generally greater than 90 feet thick and extends to the bedrock. Although there is not distinct boundary between the formations in the regional aquifer, the regional aquifer is considered here to be comprised of two distinct hydrogeologic units given the gradation from silty sand to coarse sand and gravel. The hydraulic conductivity of the upper regional zone determined by slug tests and pumping tests is 1×10^{-2} cm/sec. The hydraulic conductivity of the lower zone of the regional aquifer determined by pumping tests is 1×10^{-1} cm/sec. Regional groundwater flows under non pumping conditions towards the Mississippi River.

Chemetco will attempt to gather the following information during installation of the proposed well system specific to the area beneath the spill:

- A qualitative assessment of porosity, texture, uniformity, lithology of all significant units

- Significant structural features

- Stratigraphic contacts between significant formations/strata

- Zones of high permeability, fracture or channeling in consolidated and unconsolidated deposits

- Perched aquifers

- Location of borehole, depth of termination

- Zone of saturation/thickness of the unit

- Interpretations of hydraulic connections between saturated zones

7.3 Proposed Monitoring Well System

A monitoring well system is proposed herein which is intended to yield representative groundwater samples from shallow groundwater beneath the Chemetco facility. Again, the purpose of this groundwater investigation is to determine whether shallow groundwater has been impacted by the zinc oxide spill undergoing clean-up.

7.3.1. Well Location and Screens

Based on data measurements collected during investigations conducted at Chemetco, flow in the shallow perched aquifer is thought to move predominately from north to south across the southeastern quadrant of the facility. Quarterly potentiometric maps for 1996, Figures 7-3.1. through 7-3.4., are included for reference. Therefore, Chemetco is anticipating a similar flow regime in the vicinity of the zinc oxide spill area. Chemetco proposes to install one upgradient well north of Containment area #1 as depicted in Figure 7-3.5. Three downgradient wells are proposed along a primarily east-west traverse just south of Long Lake and the temporary diversion channel south of Containment Area #3 also as depicted in Figure 7-3.5. All wells will be screened at similar depths. Total depth of wells should not exceed 25 feet below ground surface (BGS). If no substantial sand lenses are encountered during drilling activities, the screens shall be set at the first water-bearing zone as encountered in the field. Hydraulic conductivity testing shall be performed in the field on all four wells.

7.3.2. Drilling Operations

Wells will be installed using a 4 1/4" hollow stem auger. There will be no addition of fluids or drilling muds. All drill cuttings will be containerized and disposed of properly.

7.3.3. Construction, Development, and Maintenance of Wells

All wells shall be constructed pursuant to Ill. Admin. Code, Part 920 of the Illinois Water Well Construction Code and the Well Construction Diagram included as Figure 7.3.6. All borings shall be continuously sampled using five foot split spoon samplers. A typical boring log and well completion report is included as Figures 7-3.7. and 7-3.8. Wells shall be constructed of the following materials:

- Well screens and risers shall be constructed of schedule 40 PVC, ASTM 2 pitch threads, 2 inch inside diameter;

- The screens shall be either 2 in/4 in Monoflex U-pack well screen, 0.010 inch slot size, ten feet in length and prepacked with 20/40 grade silica sand; or, a 2 in, 0.010 inch slot size, ten feet in length schedule 40 PVC well screen;

- If a pre-packed screen is not utilized, an artificial filter pack shall be placed in the annular space between the borehole wall and the screen. The filter pack material shall be chemically inert and installed in a manner that prevents bridging and particle-size segregation. At least two inches of filter pack material should be installed between the well screen and the borehole wall.

- Casing and screen material are to be decontaminated prior to installation to remove any coatings or manufacturing residues. Decontamination includes a wash with a mild non-phosphate detergent/potable water solution and a rinse with potable water;

- Silica sand (20/40 grade) will be used to extend the filter pack to a length no greater than two feet above the top of the screen;

- A minimum of two feet of bentonite, either granular, pellets, or chips shall be placed around the casing by means of prehydrating at the surface and pumping through a tremie pipe. The bentonite seal is to be allowed to completely hydrate, set or cure in conformance with the manufacturer's specification prior to installing the grout seal in the annular seal;

- The annular space above the bentonite seal is to be filled with a neat cement containing bentonite from 2% to 6% by weight or a combination thereof;

- Wells will be constructed with a 4' by 4' concrete pad with (4) 6" steel bumper posts placed on the corners of the pad; and,

- Wells will be constructed with lockable steel well covers.

All wells shall be properly developed to ensure the collection of representative groundwater samples. All water removed from the wells shall be containerized until analyses are received from the lab, at which time it shall be disposed of appropriately.

The integrity and condition of each well shall be inspected quarterly during sampling activities. This shall be noted in the field notebook and sample collection record form. Any activities related to well maintenance shall also be recorded in the aforementioned records.

7.3.4. Protection and Identification of Wells

Wells will be protected from damage by constructing a 4' x 4' concrete pad with (4) 6" steel bumper posts on the corners of the pad. Lockable steel well covers, 4" x 5' in size, shall be also be utilized.

All wells shall be surveyed to determine their location as well as their distances from the spill area and their distance from each other. These locations shall be surveyed by a licensed professional surveyor (or equivalent) within +/-0.01 foot in relation to mean sea level, which in turn is established by reference to an established National Geodetic Vertical Datum. The surveyed reference mark shall be clearly and permanently marked on top of the inner well casing.

The well identification numbers, monitor point number, shall be clearly and permanently marked on the outside of the protective cover.

7.3.5. Well Replacement

A monitoring well will be replaced if it is damaged, if it does not consistently produce a sample, or if there are problems attributable to well construction. If a well is replaced, all conditions specified in Attachment E to the DRAFT IEPA RCRA Closure Guidance Document dated November 1994 as well as Ill. Admin. Code Part 920 will be followed.

7.3.6. Well Plugging and Abandonment Procedures

At such time a well must be plugged or abandoned, the Agency shall be notified and such activities shall be executed in accordance with 77 Ill. Admin. Code 920.120 (b) (7) by grouting from the bottom up with a tremie pipe using neat cement containing bentonite from 2% to 6% by weight or combination thereof. This material shall be applied the full depth of the well and terminate within three feet of the ground surface. Final three feet shall be filled with premix concrete to the surface. Monitor Well Reports shall be submitted to the Illinois Department of Public Health within 30 days after monitor wells have been completed on forms as are prescribed and furnished by the Department. Boring logs and monitor well completion reports shall be submitted as part of the report of findings for this Phase I investigation.

7.4. Sampling and Analysis Plan

Please refer to Attachment 9 which contains the Sampling and Analysis Plan.

7.5. Parameters

Since the groundwater monitoring proposed herein pertains to the zinc oxide spill, Chemetco is proposing to sample shallow groundwater for indicator parameters, the eight RCRA metals, and zinc as listed below:

- pH;
- Specific Conductance;
- TOX;
- TOC;
- Lead;
- Cadmium;
- Zinc;

- Arsenic;
- Barium;
- Silver:
- Mercury;
- Selenium; and,
- Chromium.

If any of the aforementioned constituents are present above the applicable Ill. Admin. Code Part 620 groundwater quality standards, confirmation sampling shall be initiated. If additional sampling confirms elevated concentrations, Chemetco will propose a Phase II investigation.

7.6. Conclusion

The purpose of the Phase I groundwater investigation contained in Section 7 is to determine the presence/absence of hazardous constituents in shallow groundwater related to the zinc oxide spill. Subsurface borings, a properly constructed monitoring well system and water quality analyses will allow such a determination.

A Phase I Report shall be prepared by Chemetco to be submitted to the Agency and at a minimum will include the following information:

- Boring logs;

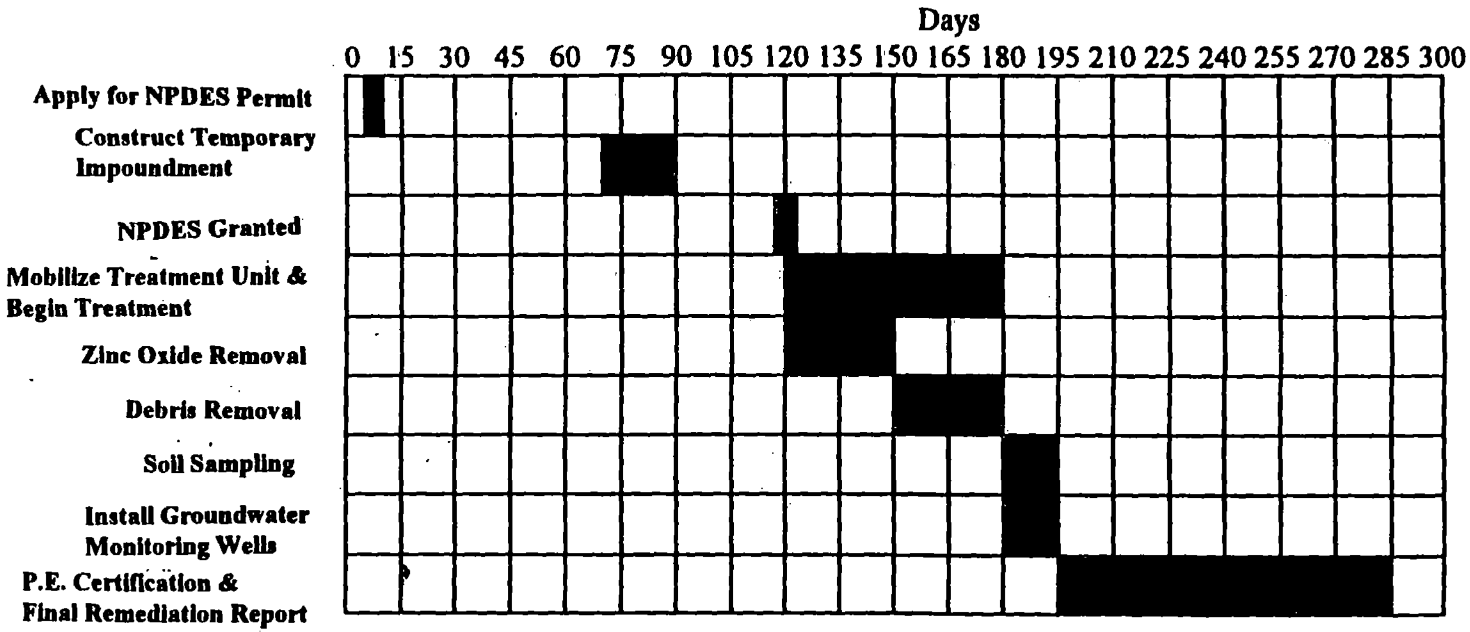
- Well completion reports;
- A description of the geology/hydrogeology in the vicinity of the zinc oxide spill;
- Two scaled geologic cross-sections with the interval over which the wells are screened clearly marked;
- An appropriately scaled map which shows the locations of borings, surface features, property boundaries, roads, spill area, etc.;
- Results of water quality analyses;
- Results of any hydraulic conductivity testing; and,
- Determination of groundwater class pursuant to 35 Ill. Admin. Code Part 620.

At such time as the results from the Phase I investigation indicate that further action related to groundwater is necessary, Chemetco shall propose additional investigation including a Phase II and/or Phase III investigation, as appropriate.

8.0 Remediation Schedule

Chemetco proposes to close the spill area in accordance with the schedule outlined in Figure 8-1. Should events beyond the control of Chemetco occur, an amendment to the remediation schedule(s) will be submitted for Agency approval.

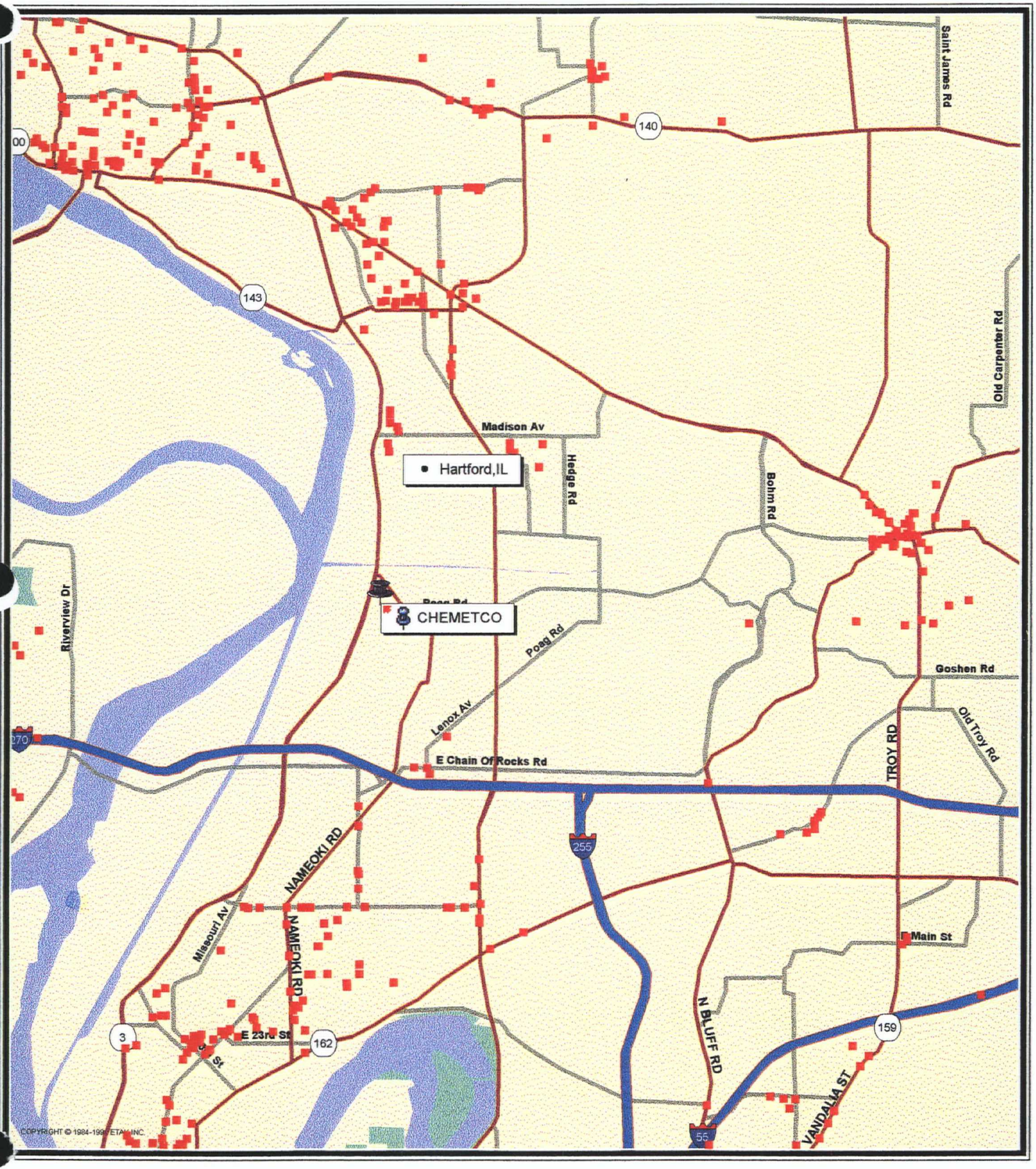
TABLE 8.1
REMEDIATION SCHEDULE
CHEMETCO, INC.



FIGURES

FIGURE 2-1

Location Map - Chemetco



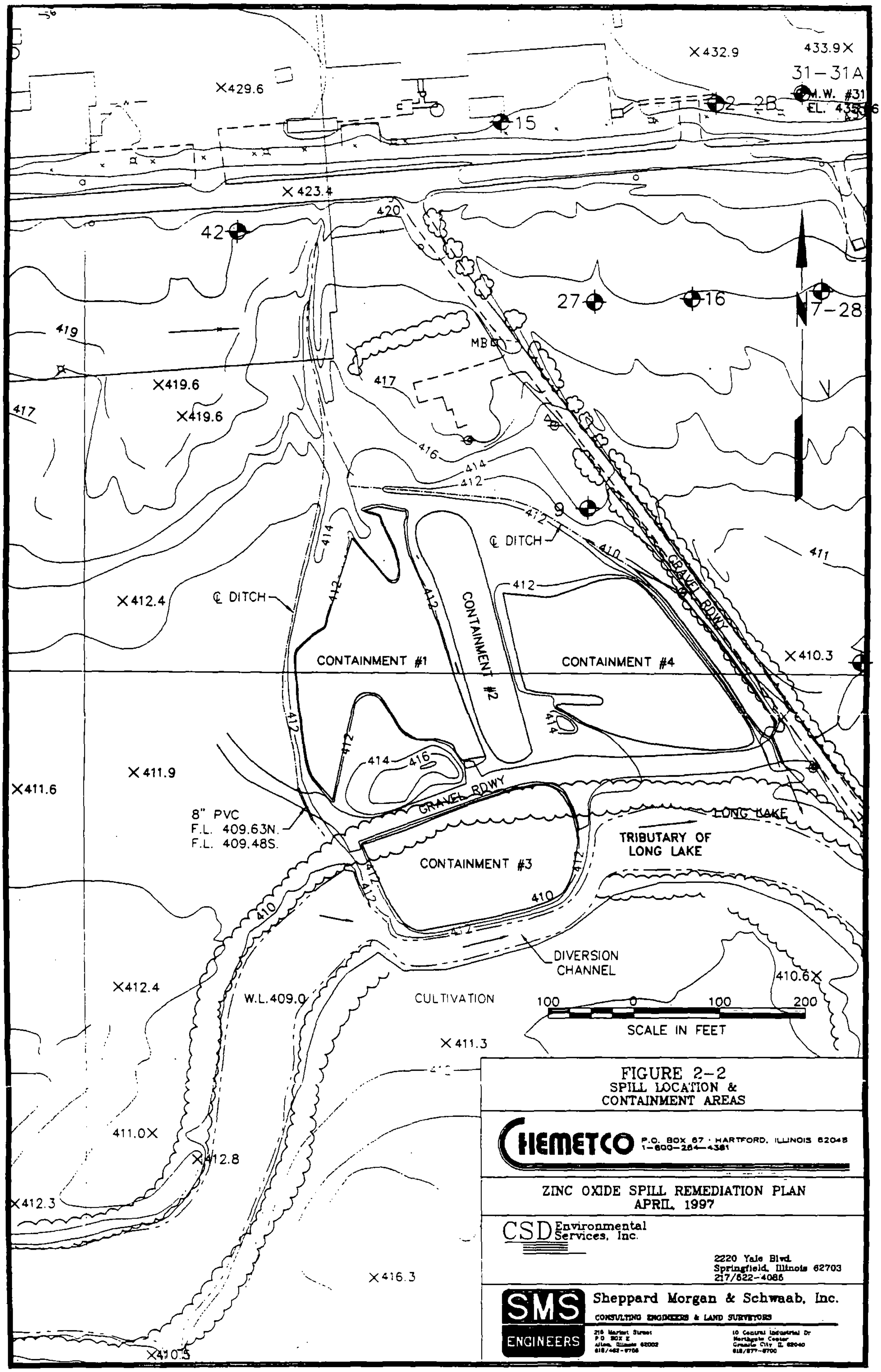


FIGURE 2-2
SPILL LOCATION &
CONTAINMENT AREAS

CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048
1-800-264-4381

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997

CSD Environmental Services, Inc.
2220 Yale Blvd.
Springfield, Illinois 62703
217/522-4086

SMS ENGINEERS
Sheppard Morgan & Schwaab, Inc.
CONSULTING ENGINEERS & LAND SURVEYORS

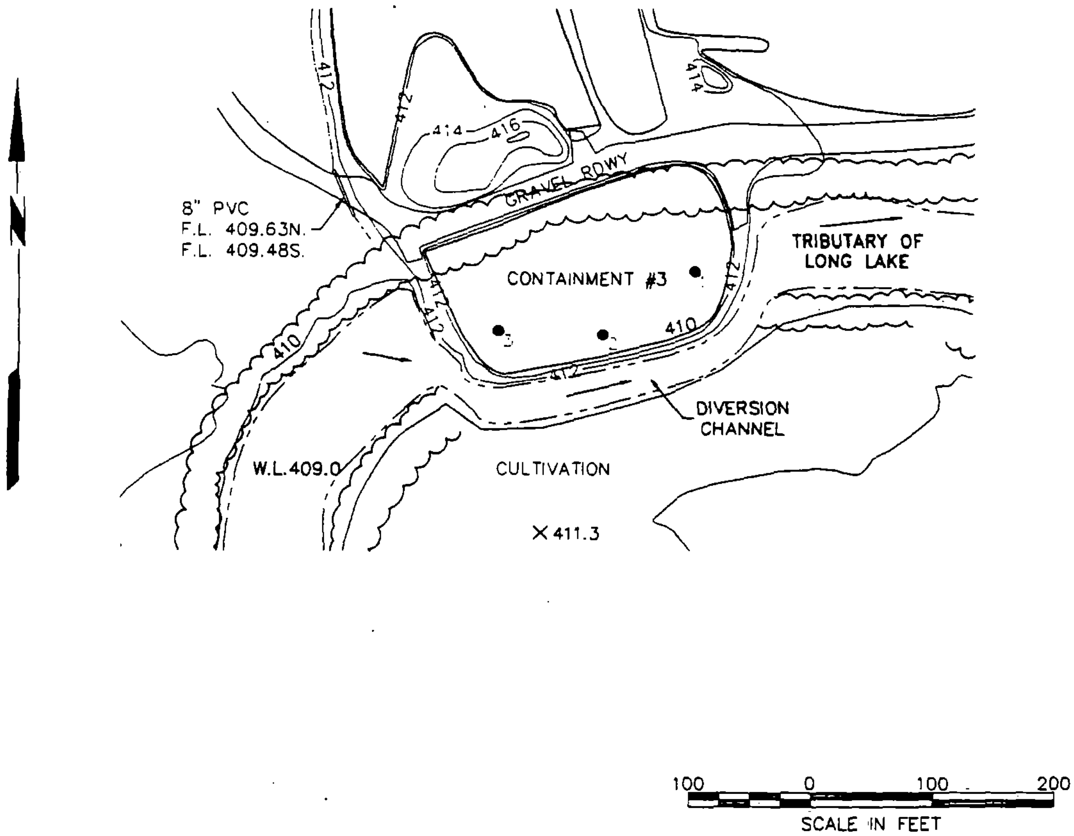


FIGURE 3-1
INITIAL EXCAVATION
SAMPLE LOCATIONS

CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048
1-800-284-4381

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL 1997

CSD Environmental Services, Inc.

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Springfield, Illinois 62703
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SMS ENGINEERS
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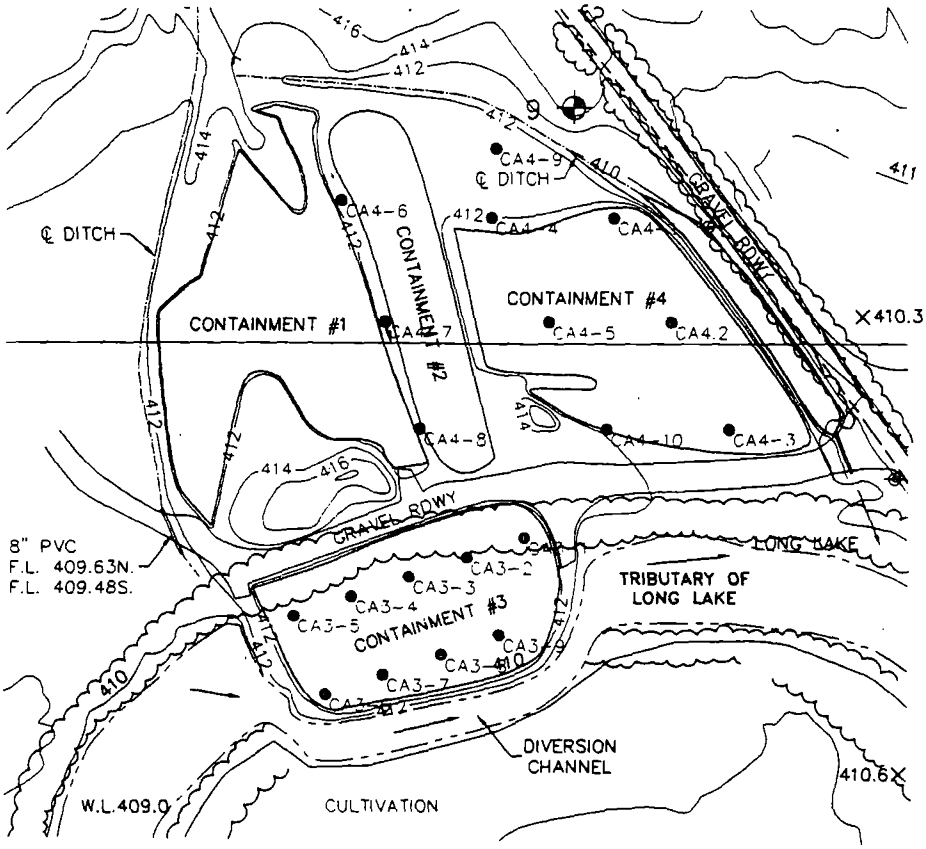

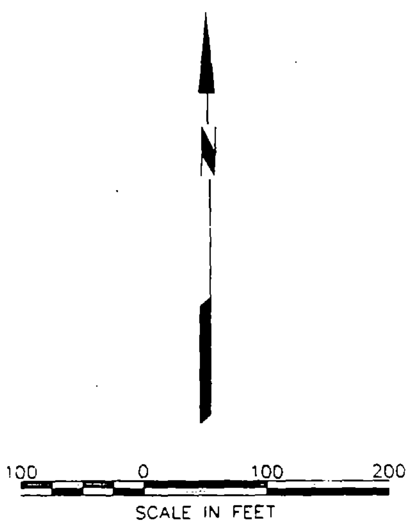

FIGURE 4-1
SAMPLE LOCATIONS
CONTAINMENT AREAS 3 & 4

CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048
1-800-254-4381

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997

CSD Environmental Services, Inc.

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Springfield, Illinois 62703
217/522-4085

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Sheppard Morgan & Schwaab, Inc.
CONSULTING ENGINEERS & LAND SURVEYORS

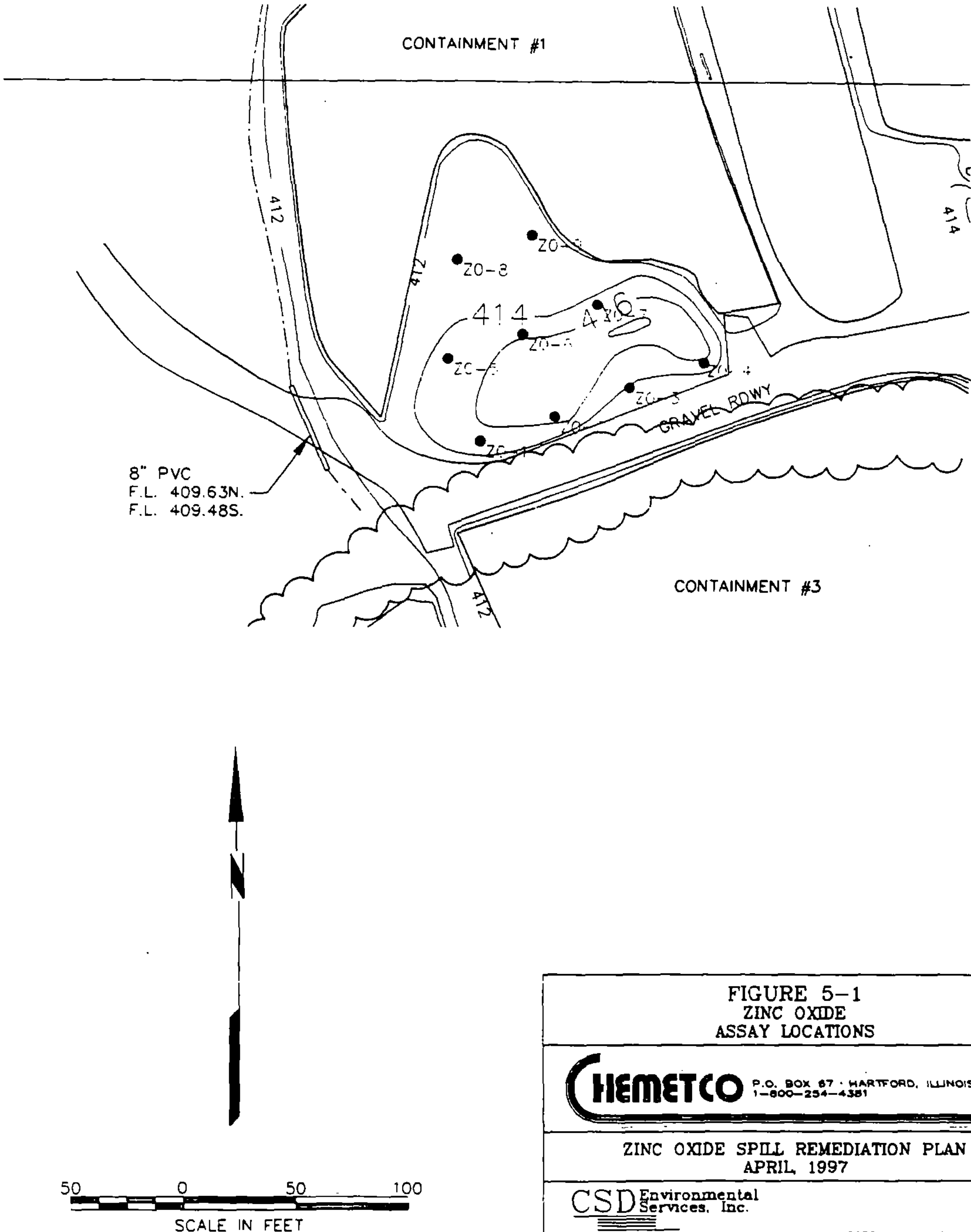

FIGURE 5-1
ZINC OXIDE
ASSAY LOCATIONS

CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048 1-800-234-4381

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997

CSD Environmental Services, Inc.
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Springfield, Illinois 62703
217/522-4085

SMS ENGINEERS
Sheppard Morgan & Schwaab, Inc.
CONSULTING ENGINEERS & LAND SURVEYORS

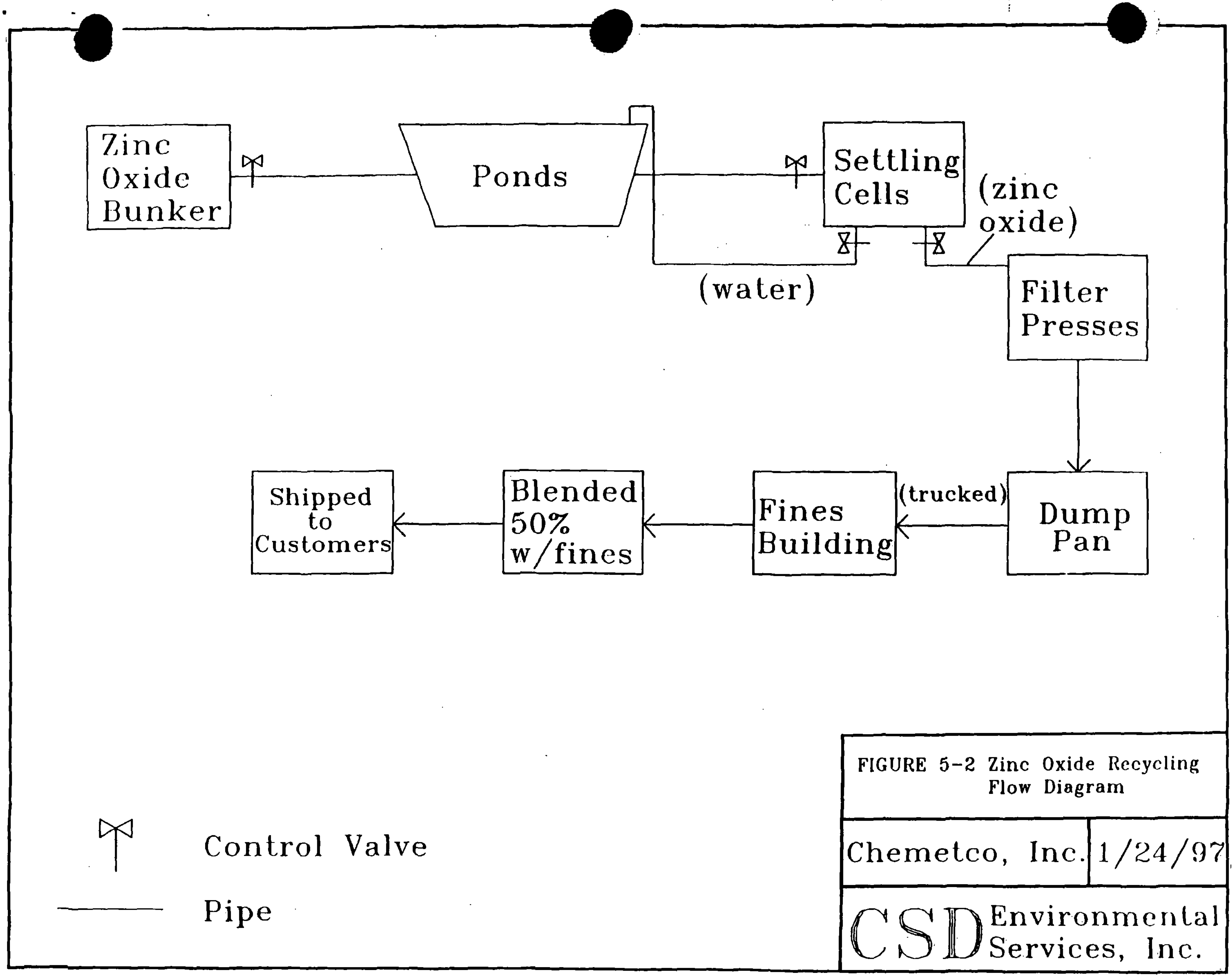


FIGURE 5-2 Zinc Oxide Recycling Flow Diagram

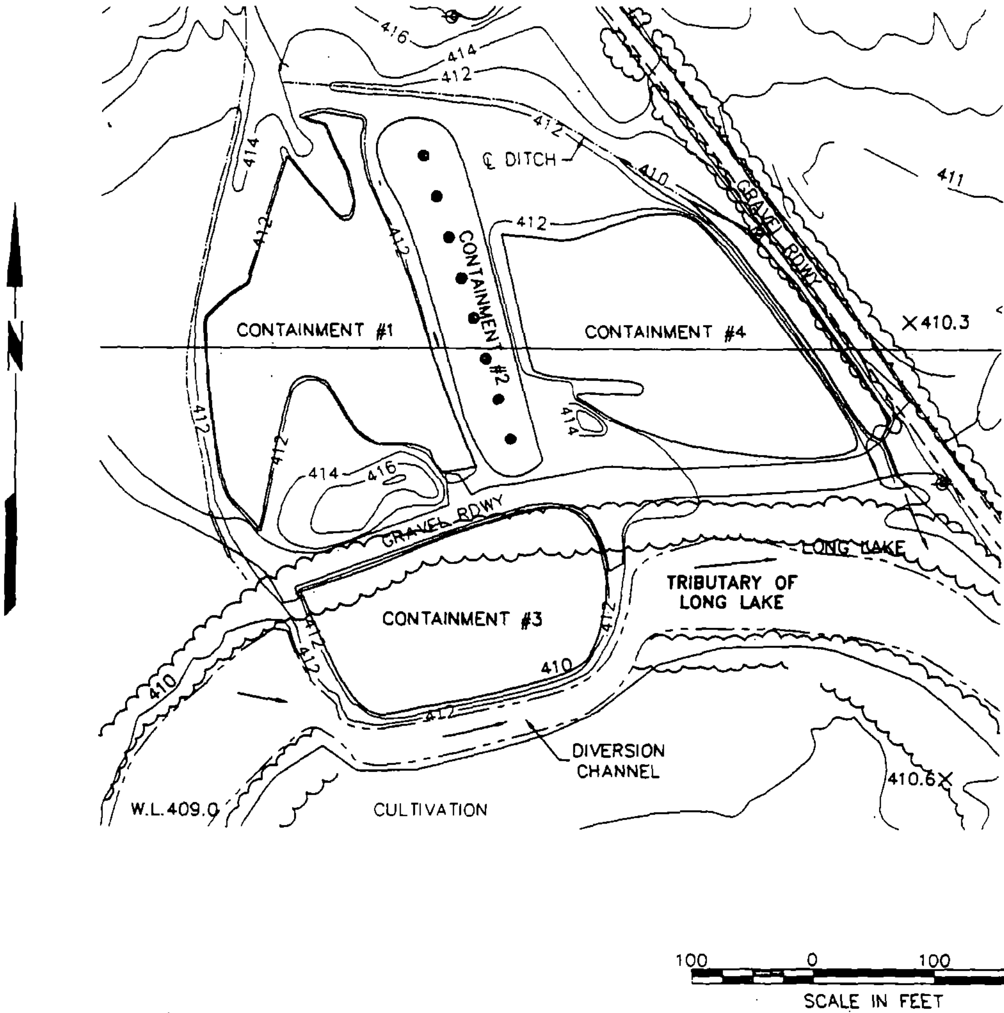


FIGURE 6-1
REVISED SAMPLE LOCATIONS
CONTAINMENT AREA #2

CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048
1-800-254-4381

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997

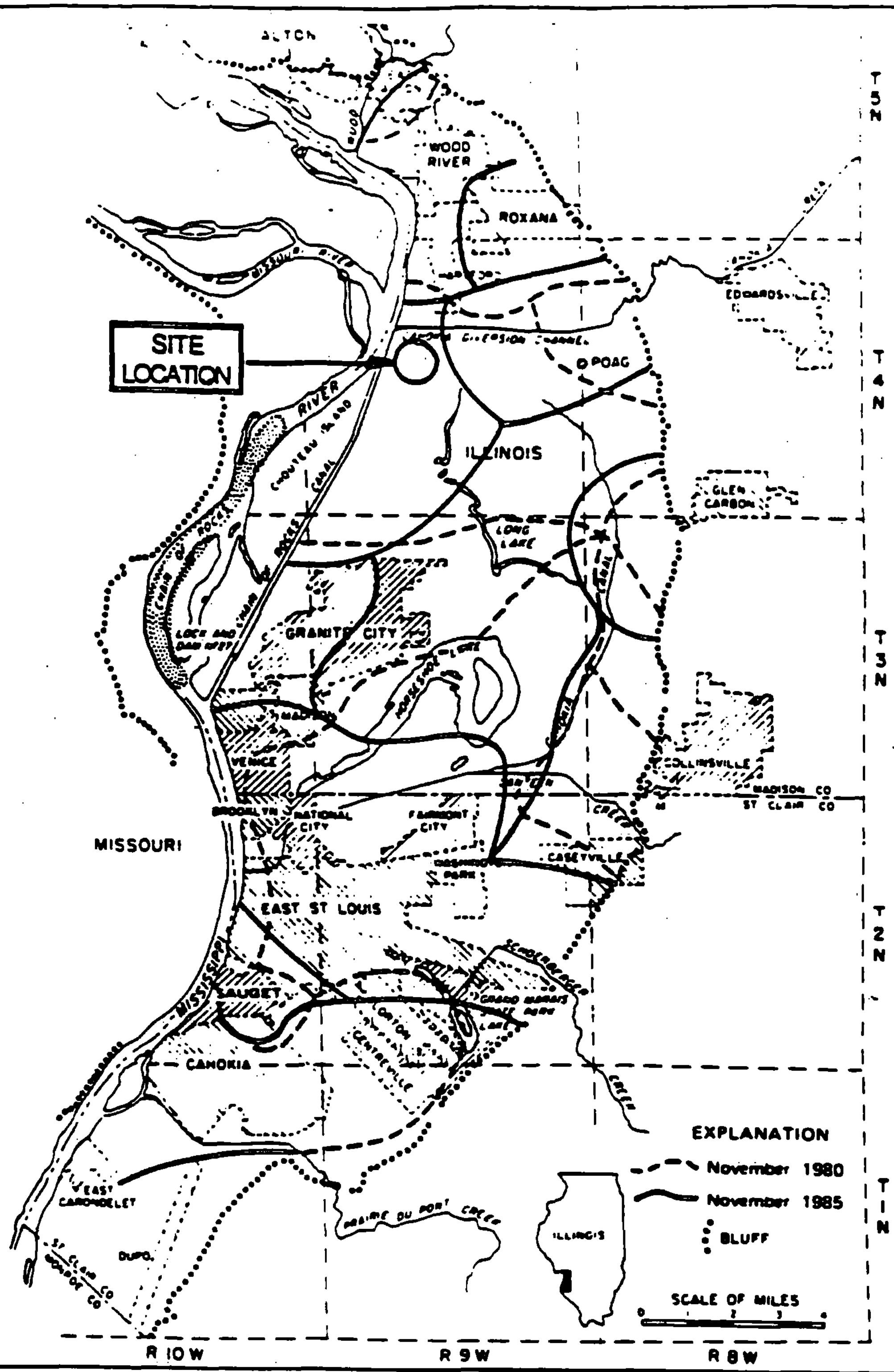
CSD Environmental Services, Inc.

2220 Yale Blvd.
Springfield, Illinois 62703
217/522-4085

SMS ENGINEERS Sheppard Morgan & Schwaab, Inc.
CONSULTING ENGINEERS & LAND SURVEYORS

215 Market Street
P.O. BOX E
Alton, Illinois 62002
618/462-9786

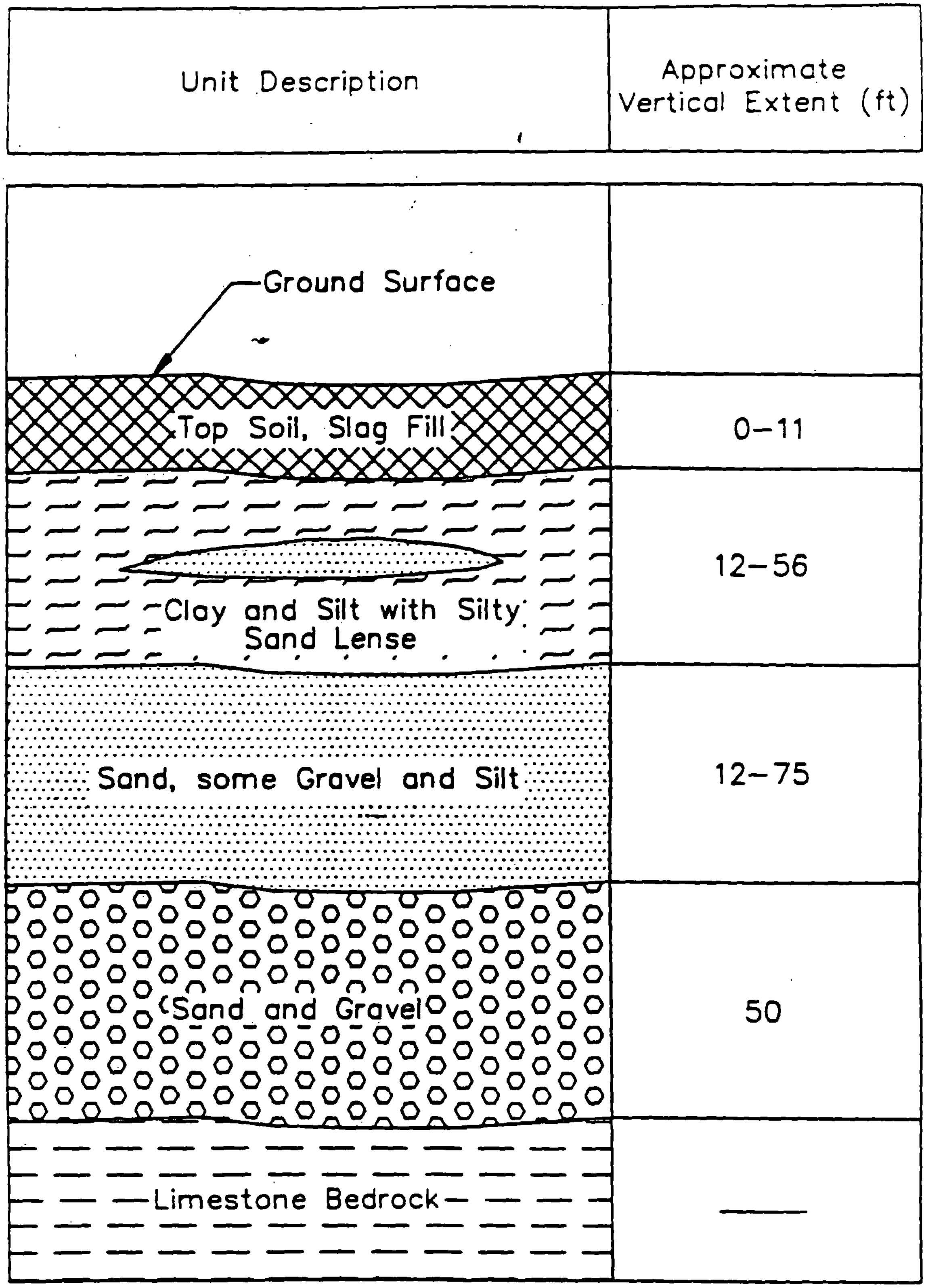
10 Central Industrial Dr
Northgate Center
Granite City IL 62040
618/877-8700



ENSR

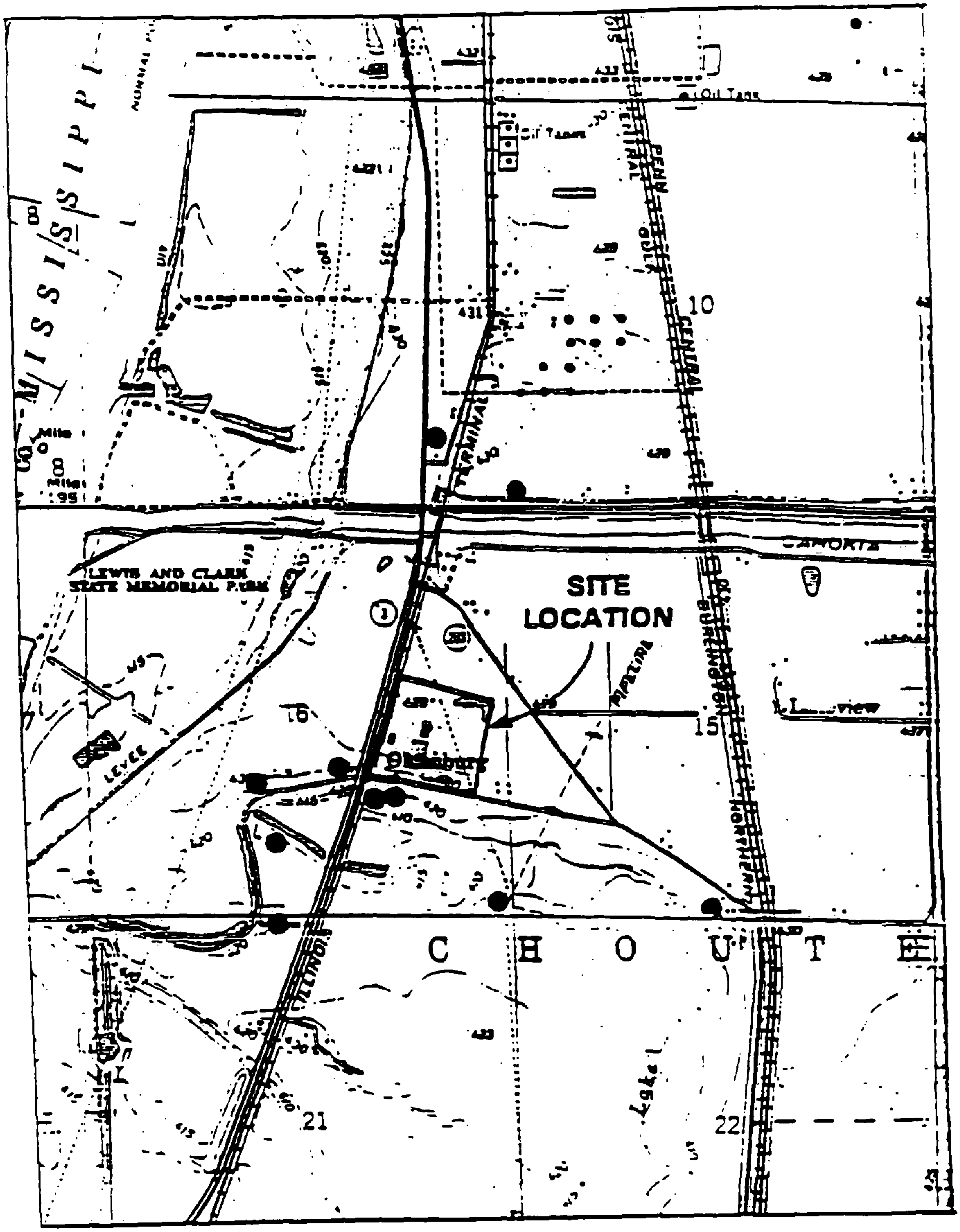
FIGURE 7-1.1
GROUND-WATER DIVIDE LOCATIONS
IN 1980 AND 1985
(TAKEN FROM KOHLHASE, 1987)
CHEMETCO, INC. HARTFORD, IL

DRAWN BY:	DATE:	PROJECT NO.:
CHK'D BY:	REVISED:	DWG. NO:



NOTE: VERTICAL EXTENT OF SLAG FILL DOES NOT INCLUDE SLAG STORAGE AREAS.

FIGURE 7-2.1
GENERALIZED CONCEPTUAL GEOLOGIC COLUMN
CHEMETCO, INC. HARTFORD, IL

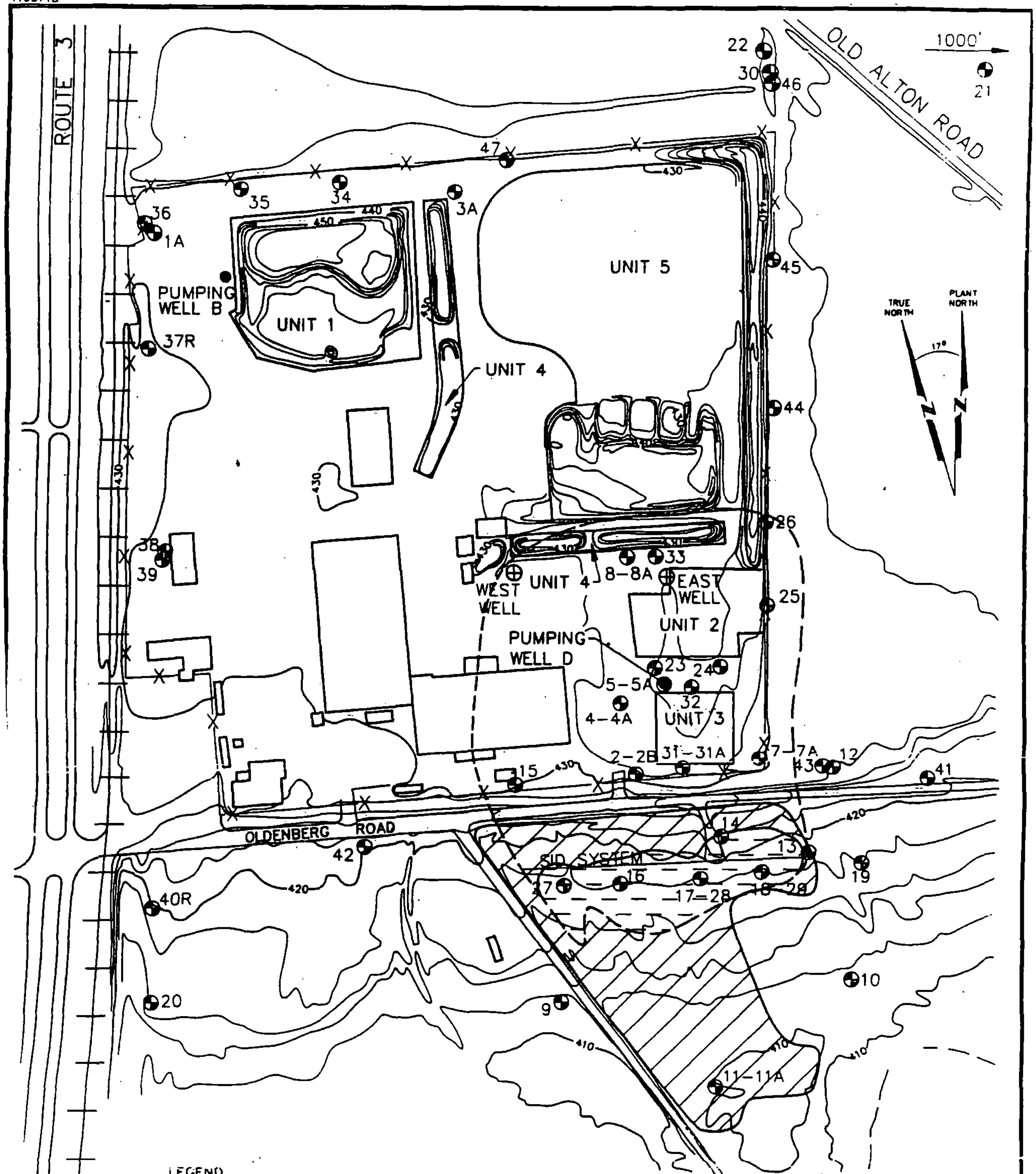


LEGEND

● PRIVATE WELL LOCATION

FIGURE 7-1.2
PRIVATE WELL LOCATIONS WITHIN ONE MILE OF THE FACILITY

110071D



LEGEND

STREAM

ROAD

FENCE

RAILROAD

SAND LENSE BOUNDARY

MONITORING WELL

PLANT WATER SUPPLY WELLS (LOCATIONS APPROXIMATE)

REMEDIATION PUMP WELL

STRESSED VEGATATION

SAND LENSE OUTCROP AT LAND SURFACE

NOTE

WELLS 2,4,5,8,18,23,24 & 37 ARE ABANDONED

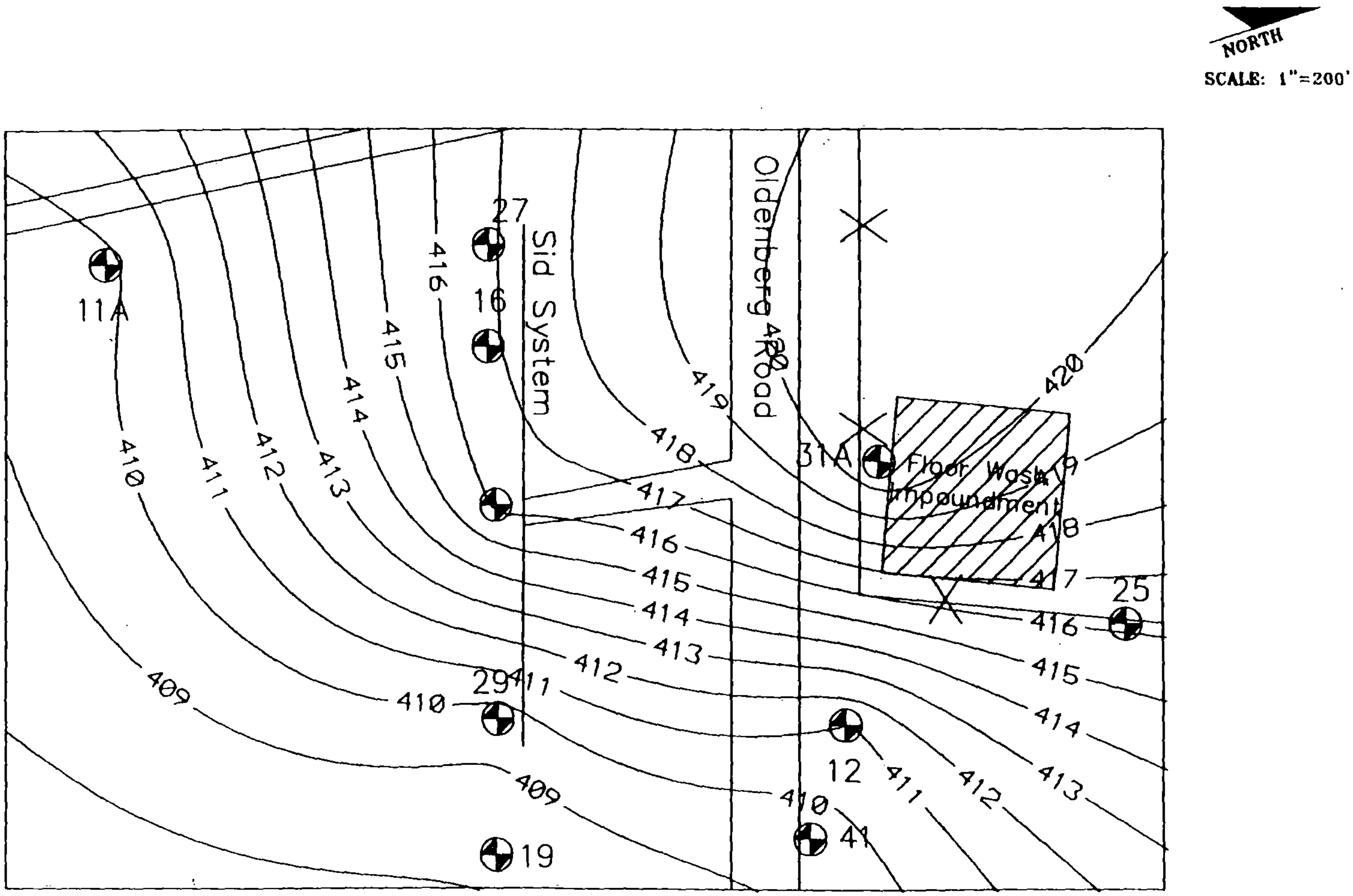
0 200 400

SCALE IN FEET
1" = 200'-0"

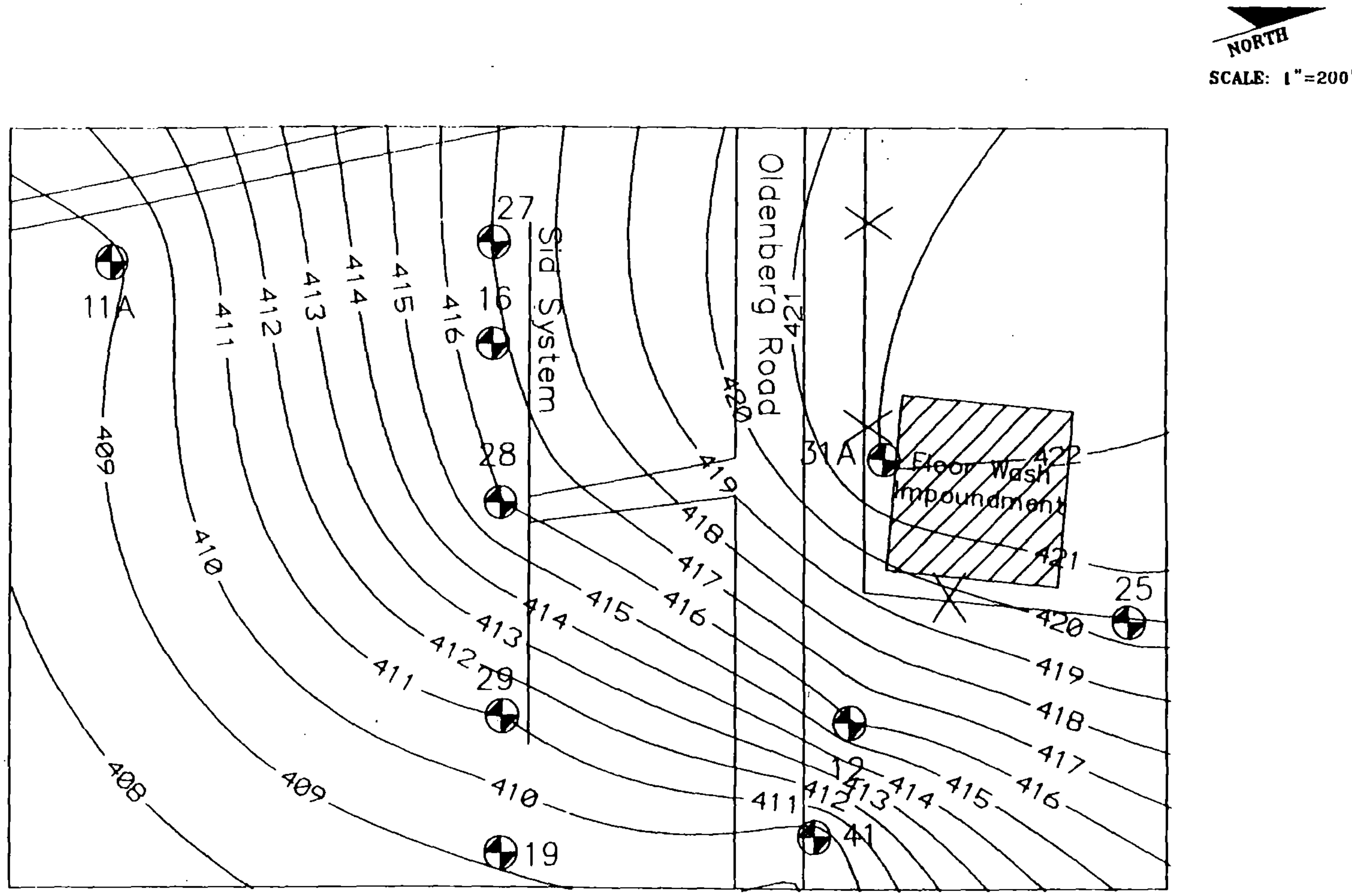
FIGURE 7-2.2

AREAL DISTRIBUTION OF SAND LENSE (PERCHED AQUIFER) WITHIN AQUITARD
CHEMETCO, INC.
HARTFORD, IL

ENSR CONSULTING & ENGINEERING



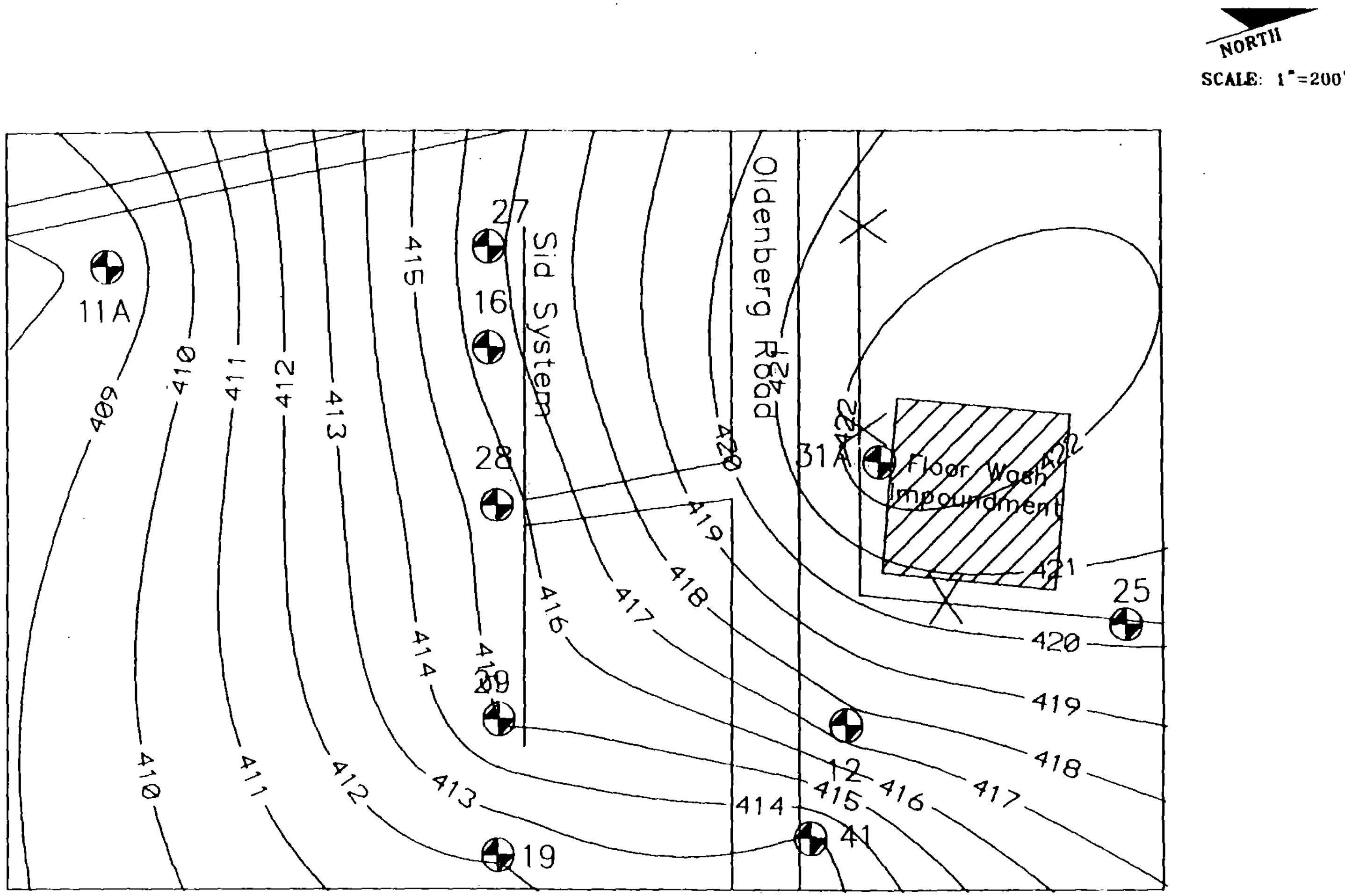
CHEMETCO INC. HARTFORD, IL.	FIGURE 7-3.1 GROUNDWATER FLOW DIRECTION FOR THE SHALLOW AQUIFER JANUARY 1996	CSD ENVIRONMENTAL SERVICES



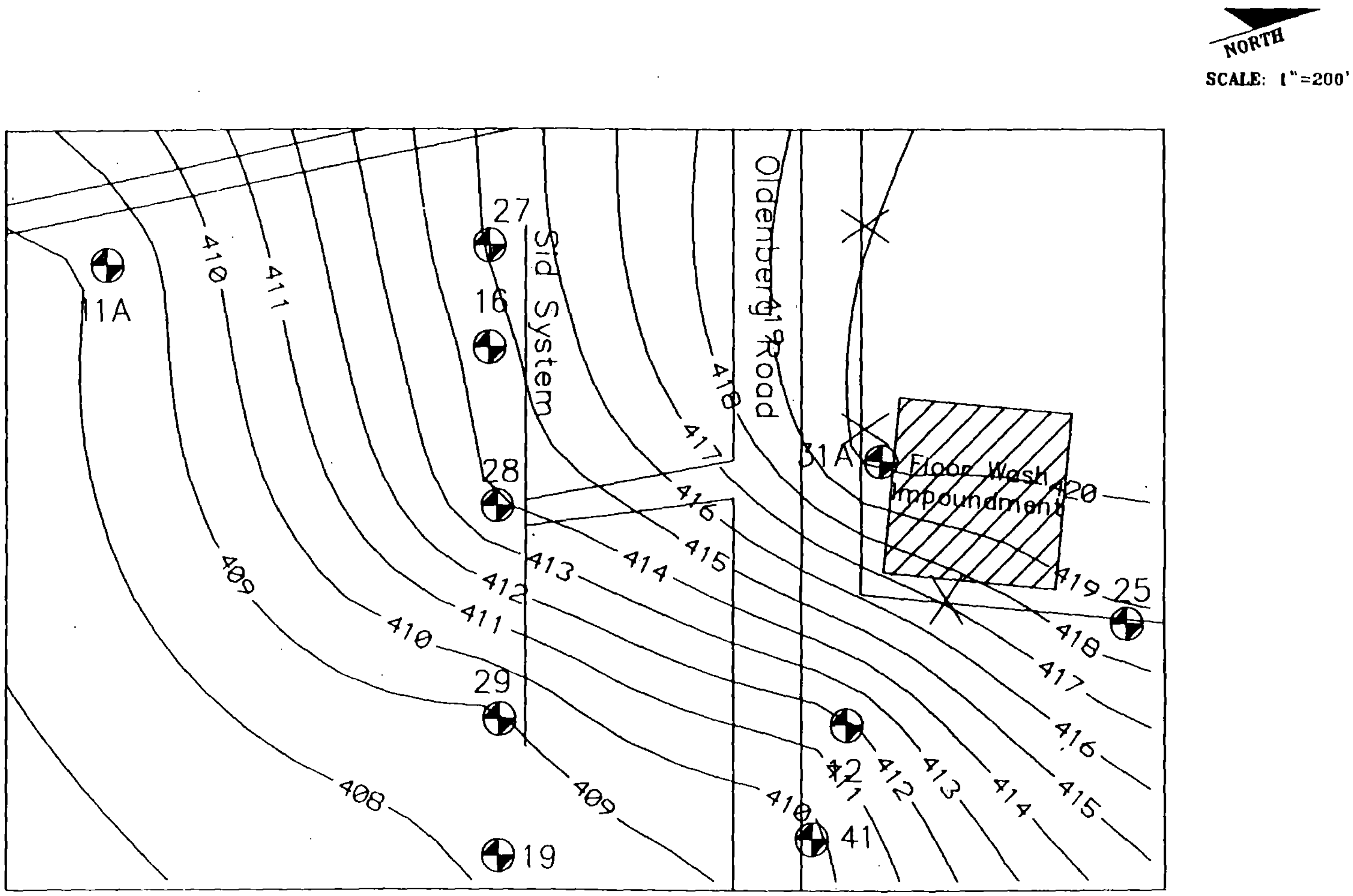
CHEMETCO INC.
HARTFORD, IL.

FIGURE 7-3.2
GROUNDWATER FLOW DIRECTION
FOR THE SHALLOW AQUIFER
APRIL 1996

CSD ENVIRONMENTAL SERVICES, INC.



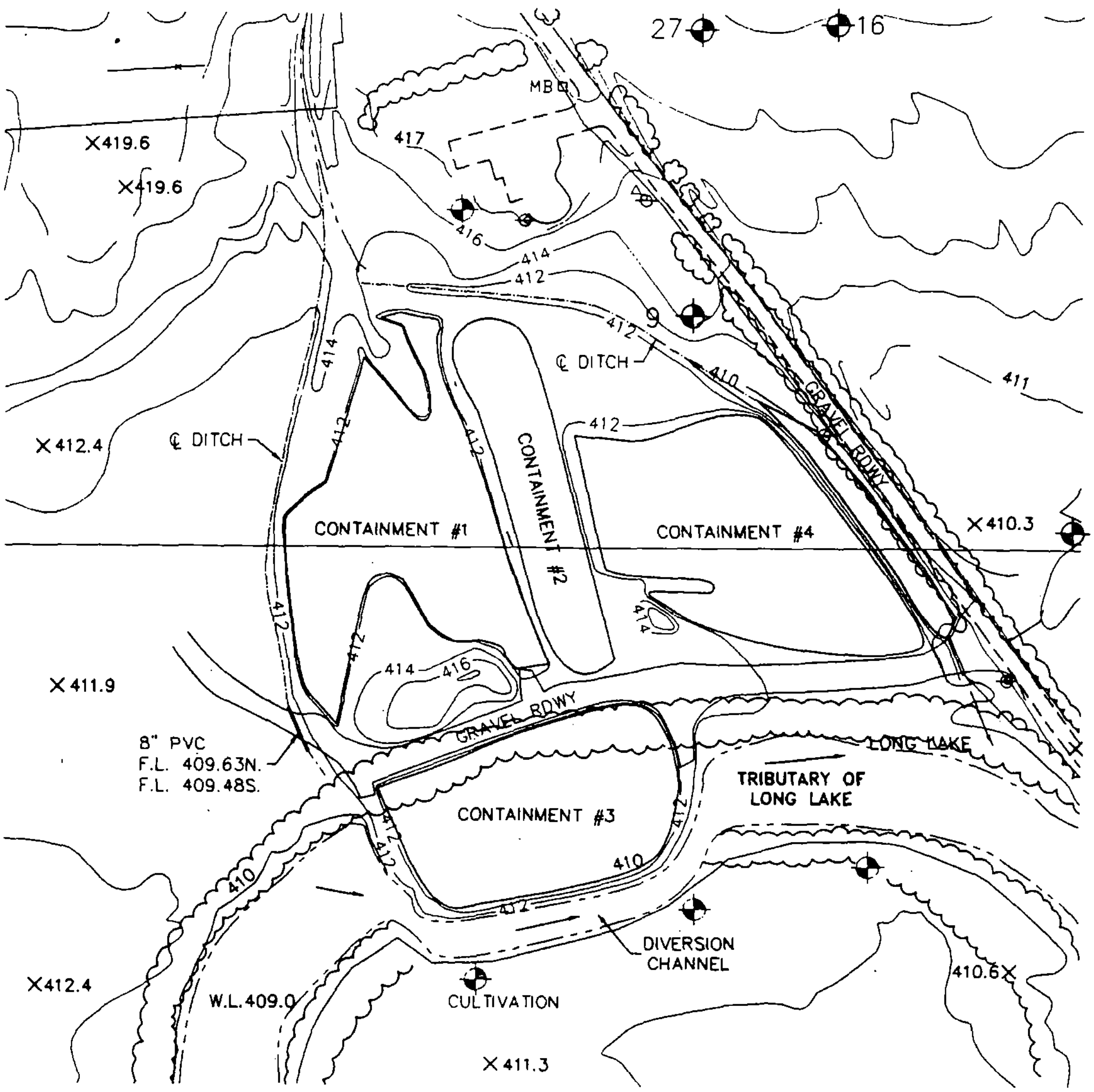
CHEMETCO INC. HARTFORD, IL.	FIGURE 7-3.3 GROUNDWATER FLOW DIRECTION FOR THE SHALLOW AQUIFER JULY 1996	CSD ENVIRONMENTAL SERVICES



CHEMETCO INC.
HARTFORD, IL.

FIGURE 7-3.4
GROUNDWATER FLOW DIRECTION
FOR THE SHALLOW AQUIFER
OCTOBER 1996

CSD ENVIRONMENTAL SERVICES, INC.



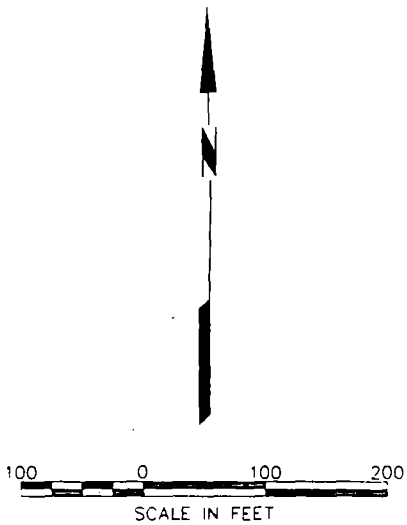


FIGURE 7-3.5
PROPOSED
MONITORING WELL LOCATIONS

CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048
1-800-264-4381

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997

CSD Environmental Services, Inc.

2220 Yale Blvd.
Springfield, Illinois 62703
217/522-4086

SMS ENGINEERS
Sheppard Morgan & Schwaab, Inc.
CONSULTING ENGINEERS & LAND SURVEYORS

215 Market Street
P.O. BOX E
Alton, Illinois 62002
618/462-8756

10 Central Industrial Dr
Northgate Center
Granite City, IL 62040
618/877-8700

CSD Environmental Services, Inc.
Typical Well Construction Diagram

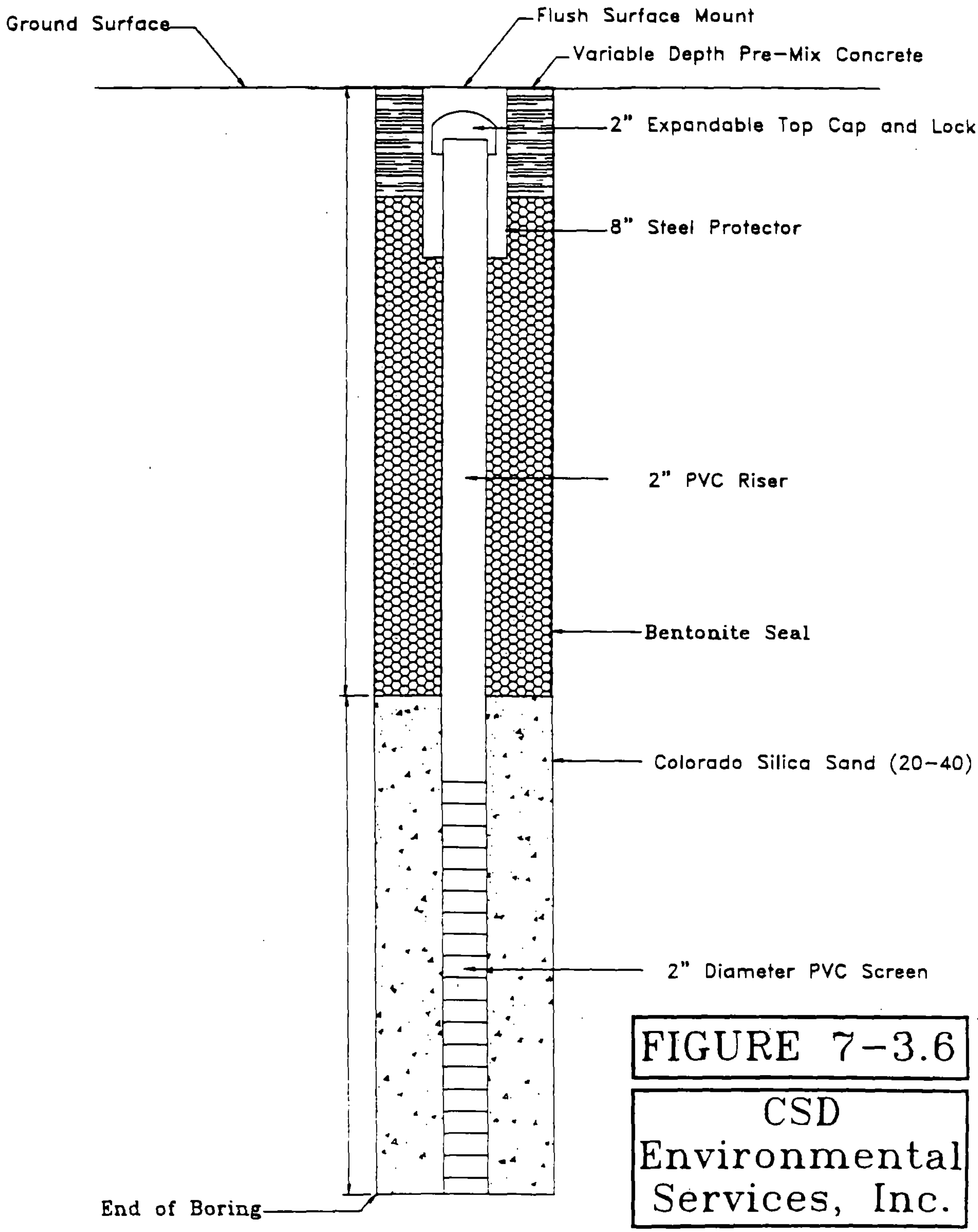


FIGURE 7-3.6

CSD Environmental Services, Inc.

FIGURE 7-3.7

UST Incident No.:	Boring Number:	Page of
Site Name: Address:	Boring Location:	Date: Start Finish

Sample Number	Sample Recovery	OVA/PID/FID	Depth (feet)	Detailed Soil and Rock Description	ASTM Unified Soil Classification	Remarks

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data		
▼ Depth While Drilling ________	Auger Depth ________	Rig Type ________
▽ Depth After Drilling ________	Rotary Depth ________	
	Driller ________	Geologist ________
	Note: Boring backfilled unless otherwise noted.	

CSD
Environmental
Services, Inc.

FIGURE 7-3.8

CSD Environmental Services

LUST Well Completion Report

Incident No.: ____________________ Well No.: ____________________

Site Name: ____________________ Date Drilled Start: ____________________

Drilling Contractor: ____________________ Date Completed: ____________________

Driller: ____________________ Geologist: ____________________

Drilling Method: ____________________ Drilling Fluids (type): ____________________

Annular Space Details

Type of Surface Seal: ____________________

Type of Annular Sealant: ____________________

Type of Bentonite Seal (Granular, Pellet): ____________________

____

Type of Sand Pack: ____________________

Elevations - .01 ft.

________ Top of Protective Casing

________ Top of Riser Pipe

________ Ground Surface

________ Top of Annular Sealant

________ Casing Stickup

________ Top of Seal

________ Total Seal Interval

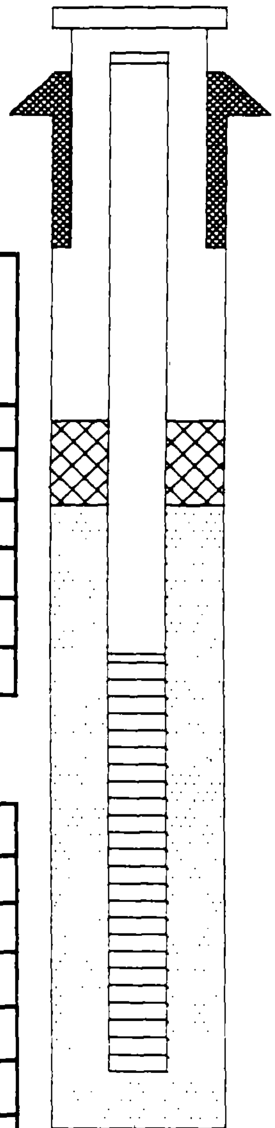
________ Top of Sand

________ Top of Screen

________ Total Screen Interval

________ Bottom of Screen

________ Bottom of Borehole



Well Construction Materials

	Stainless Steel Specify Type	PVC Specify Type	Other Specify Type
Riser coupling joint			
Riser pipe above w.t			
Riser pipe below w.t.			
Screen			
Coupling joint screen to riser			
Protective casing			

Measurements

to .01 ft (where applicable)

Riser pipe length	
Screen length	
Screen slot size	
Protective casing length	
Depth to water	
Elevation of Water	
Free Product thickness	
Gallons removed (develop)	
Gallons removed (purge)	
Other	

Completed by: ____________________

ATTACHMENT 1

Revised Work Plan - 10/10/96

TABLE 8.1
REMEDIATION SCHEDULE
CHEMETCO, INC.

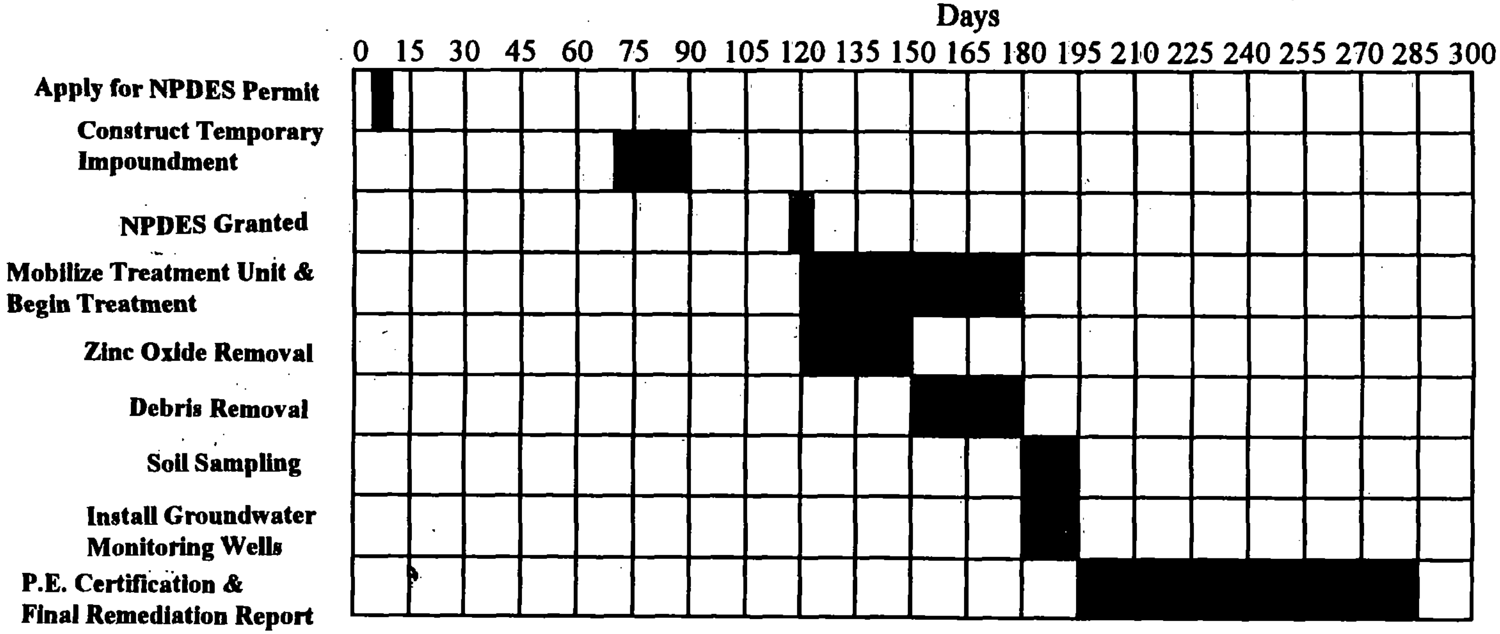
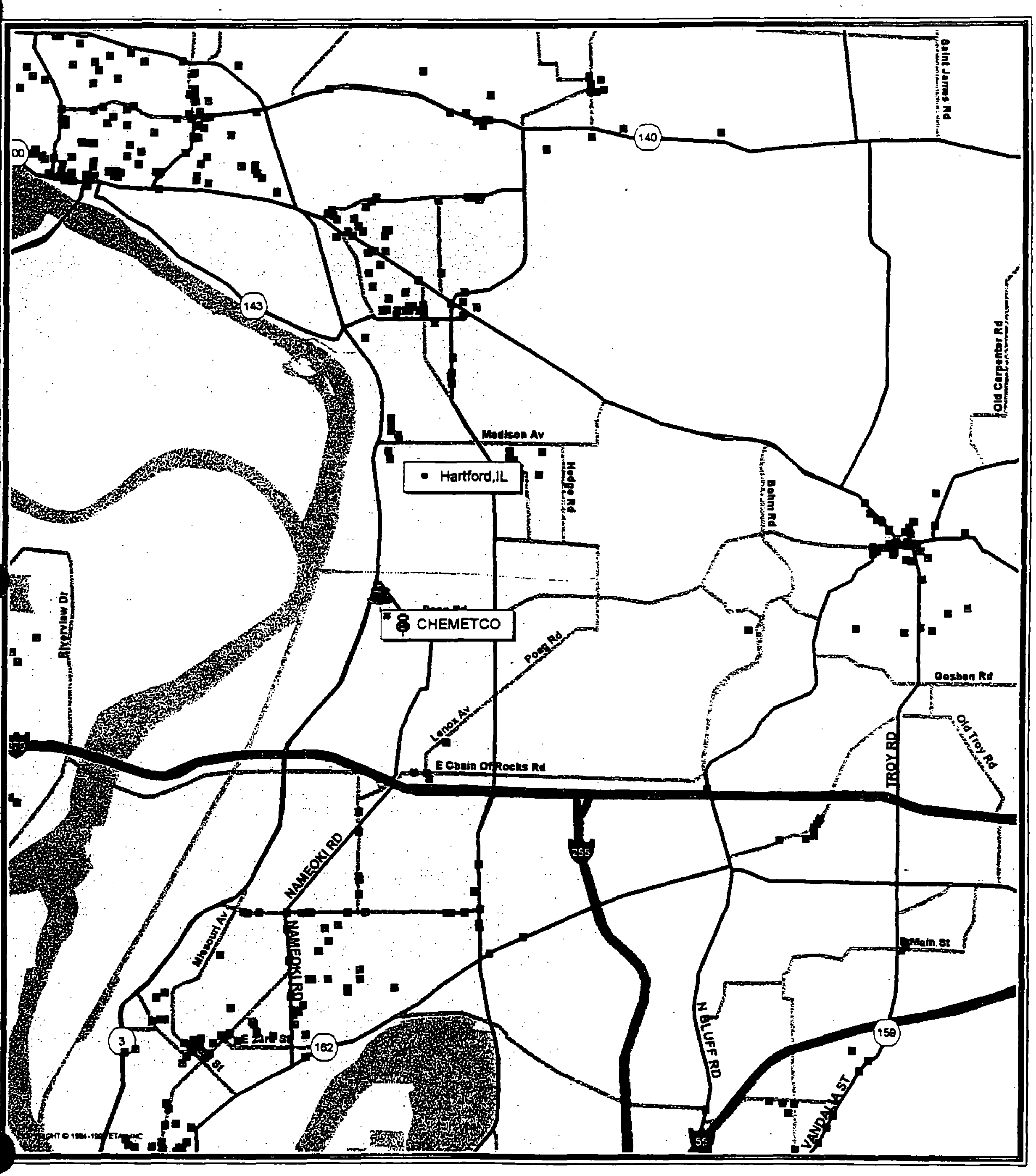
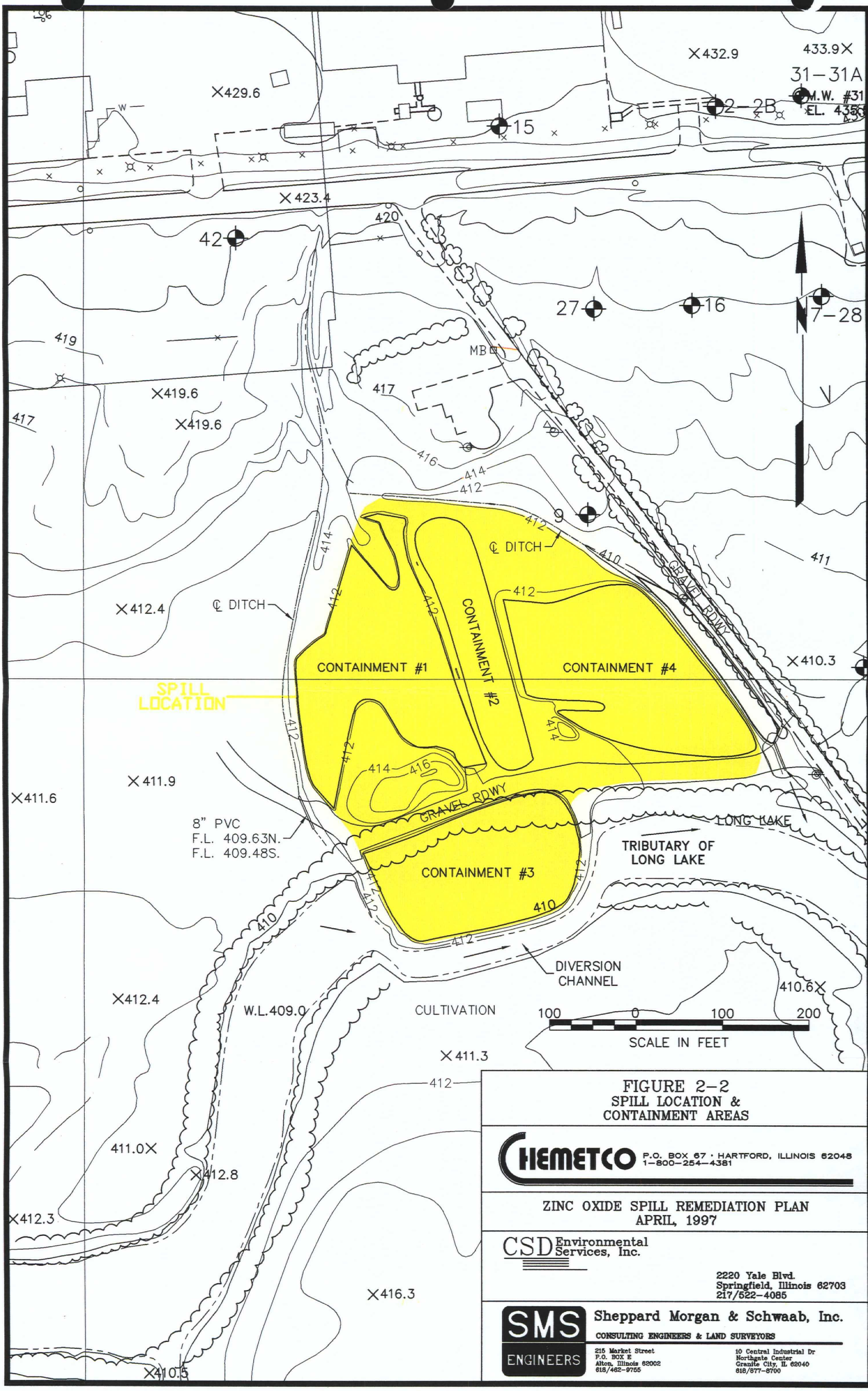


FIGURE 2-1

Location Map - Chemetco




X432.9
433.9X
31-31A
M.W. #31
EL. 435.36
X429.6
2-2B
15
X423.4
420
42
27
16
7-28
419
MB
417
X419.6
X419.6
417
416
414
412
9
412
℄ DITCH
410
411
GRAVEL RDWY
414
412
CONTAINMENT #2
412
X412.4
℄ DITCH
412
CONTAINMENT #1
CONTAINMENT #4
X410.3
SPILL LOCATION
412
414
412
414
416
X411.9
X411.6
GRAVEL RDWY
8" PVC
F.L. 409.63N.
F.L. 409.48S.
LONG LAKE
TRIBUTARY OF LONG LAKE
CONTAINMENT #3
412
412
410
410
412
DIVERSION CHANNEL
410.6X
X412.4
W.L.409.0
CULTIVATION
100 0 100 200
SCALE IN FEET
X411.3
412
FIGURE 2-2
SPILL LOCATION & CONTAINMENT AREAS
CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048 1-800-254-4381
ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997
CSD Environmental Services, Inc.
2220 Yale Blvd.
Springfield, Illinois 62703
217/522-4085
SMS ENGINEERS
Sheppard Morgan & Schwaab, Inc.
CONSULTING ENGINEERS & LAND SURVEYORS
215 Market Street
P.O. BOX E
Alton, Illinois 62002
618/462-9755
10 Central Industrial Dr
Northgate Center
Granite City, IL 62040
618/877-8700
411.0X
X412.8
X412.3
X416.3
X410.5

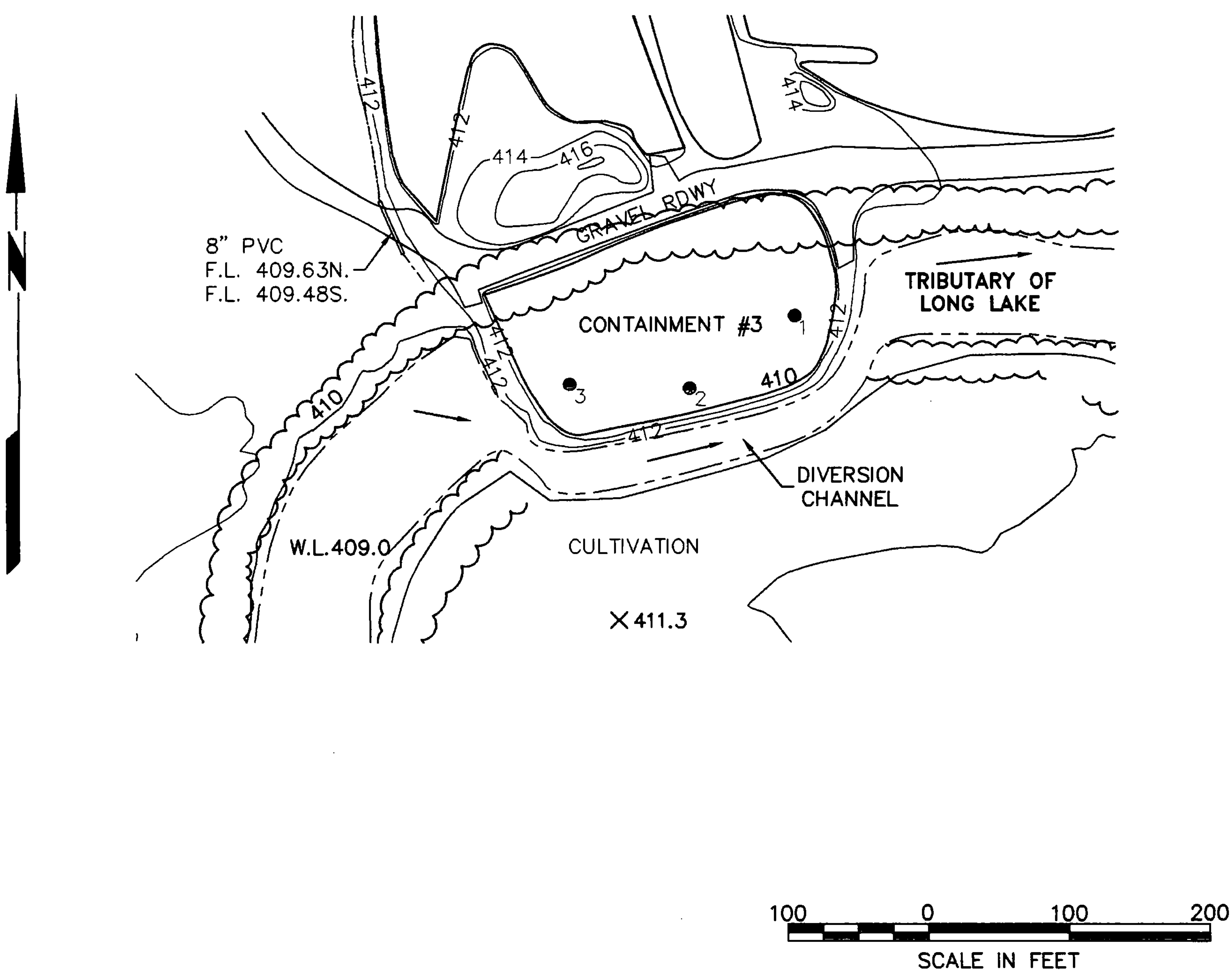


FIGURE 3-1
INITIAL EXCAVATION
SAMPLE LOCATIONS

CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048
1-800-254-4381

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997

CSD Environmental Services, Inc.

2220 Yale Blvd.
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10 Central Industrial Dr
Northgate Center
Granite City, IL 62040
618/877-8700

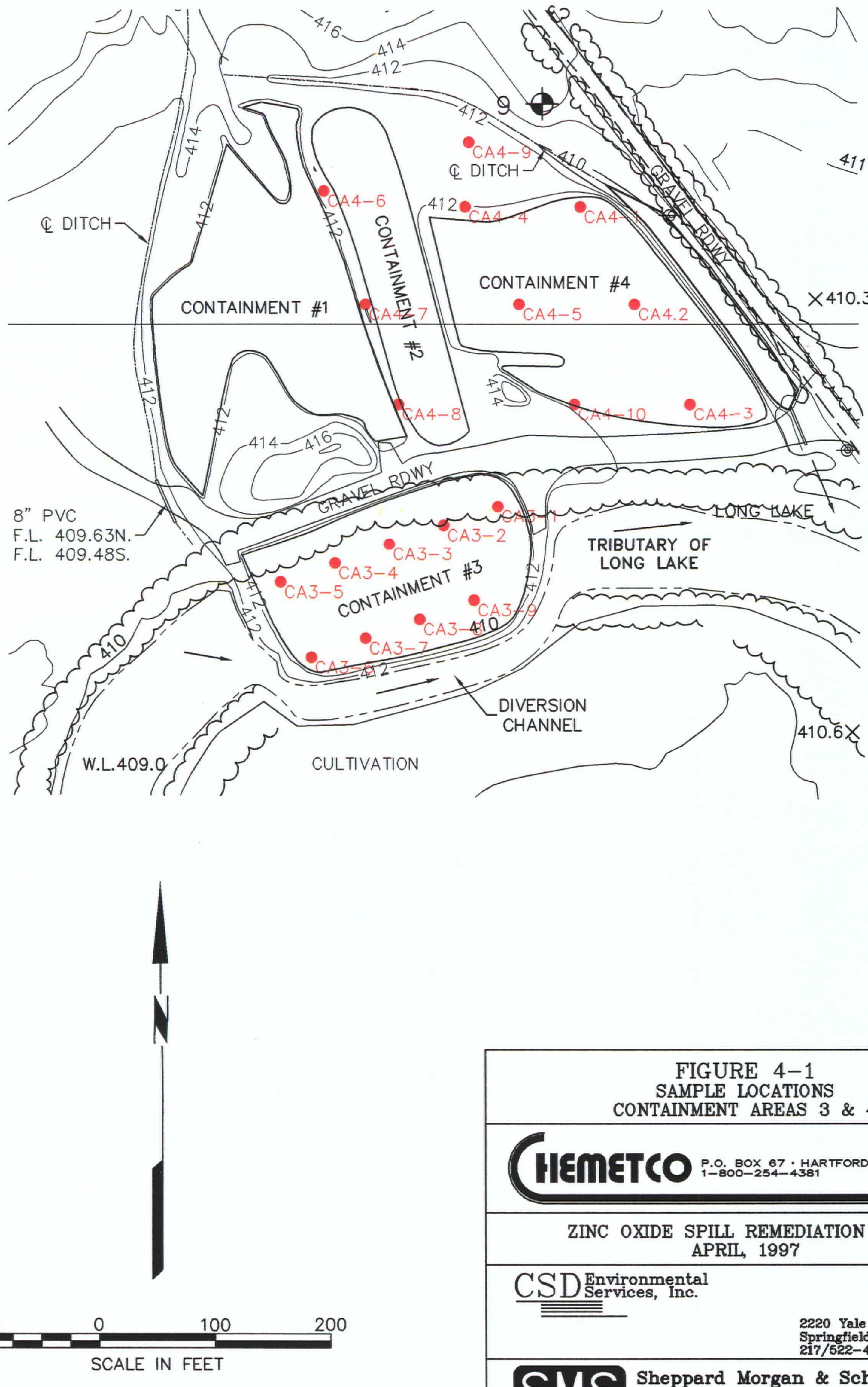

FIGURE 4-1
SAMPLE LOCATIONS
CONTAINMENT AREAS 3 & 4

CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048
1-800-254-4381

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997

CSD Environmental Services, Inc.
2220 Yale Blvd.
Springfield, Illinois 62703
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215 Market Street
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618/462-9755
10 Central Industrial Dr
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Granite City, IL 62040
618/877-8700

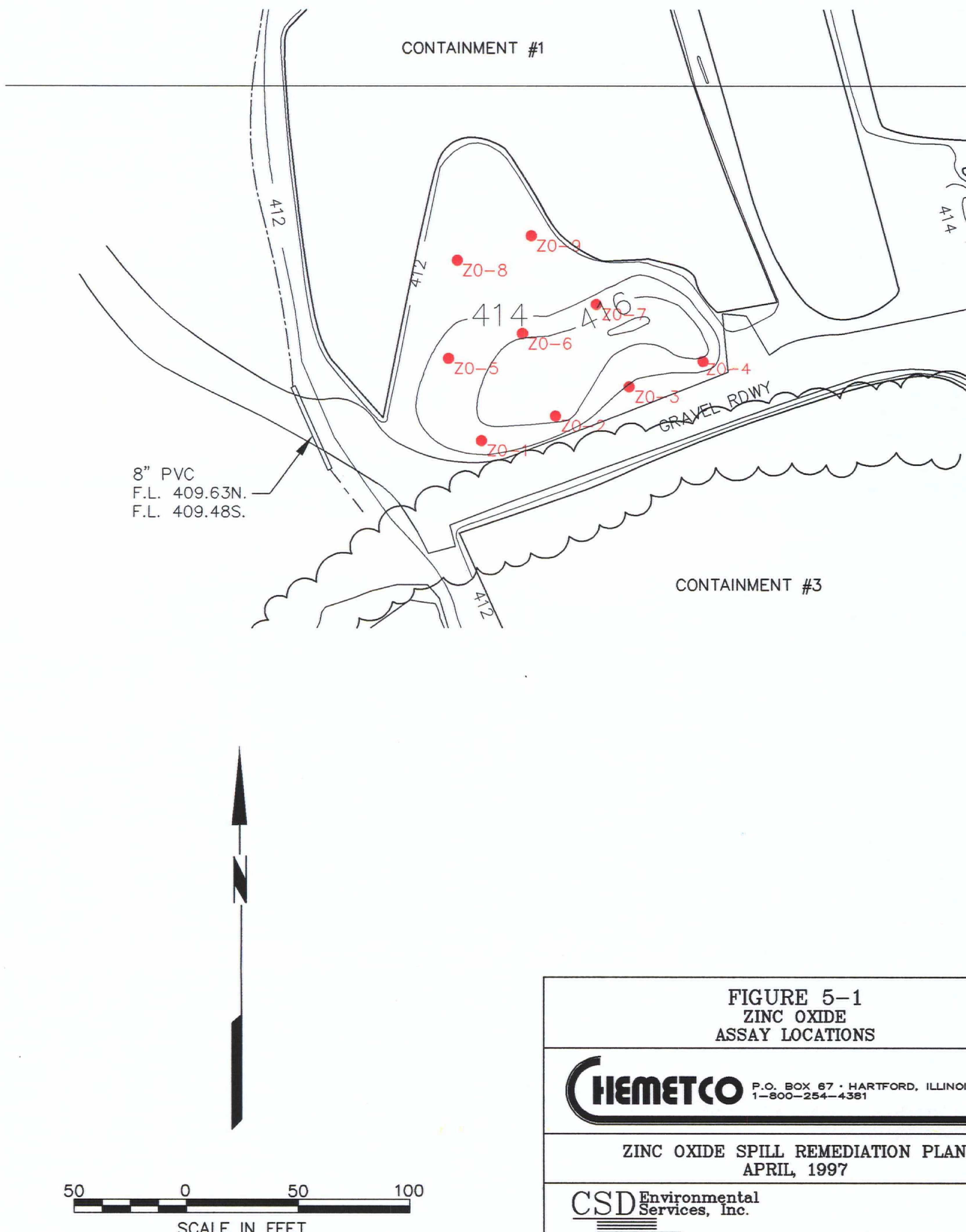

FIGURE 5-1
ZINC OXIDE ASSAY LOCATIONS

CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048
1-800-254-4381

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997

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215 Market Street
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Granite City, IL 62040
618/877-8700

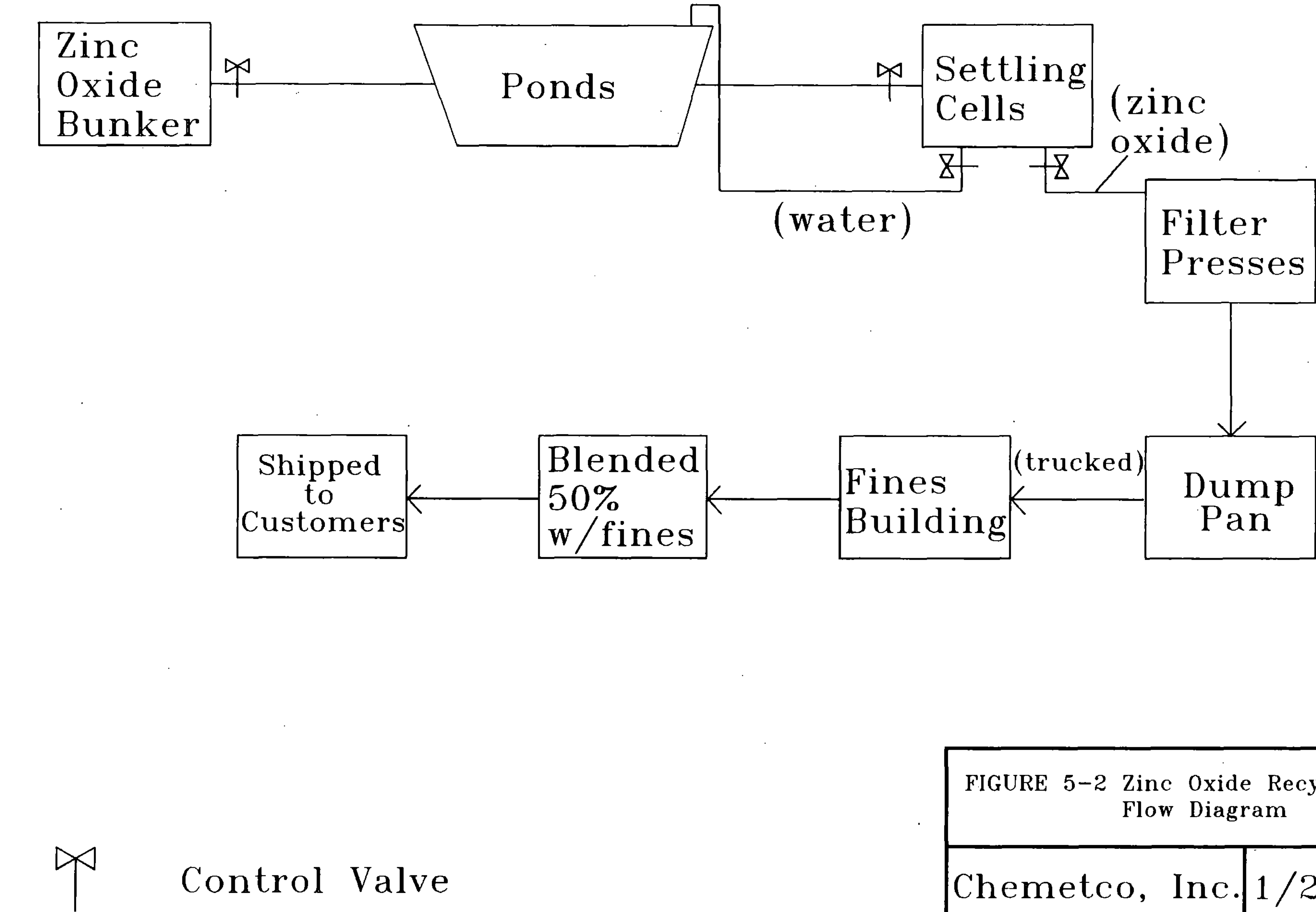

FIGURE 5-2 Zinc Oxide Recycling Flow Diagram

Chemetco, Inc.	1/24/97

CSD Environmental Services, Inc.

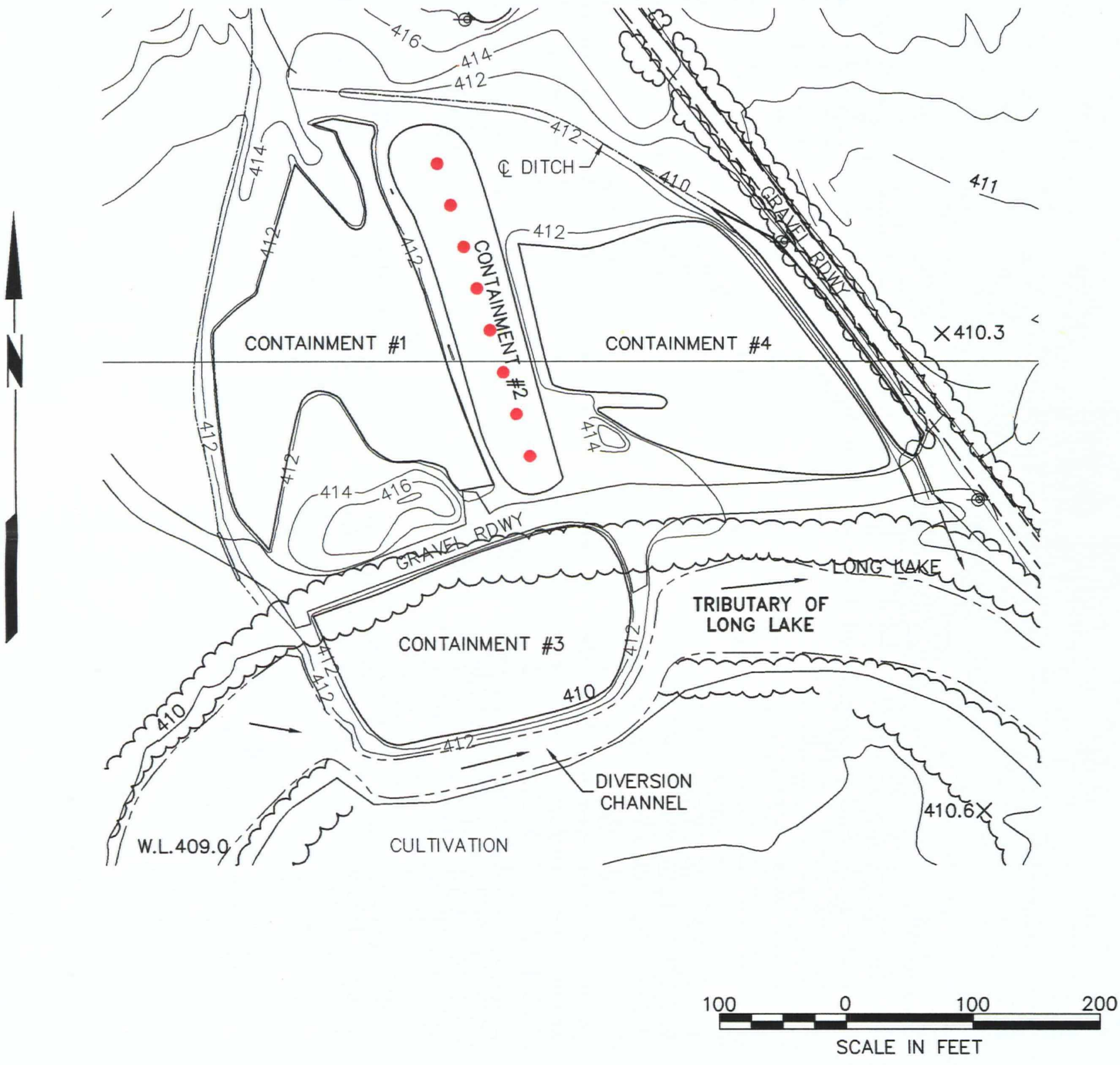

FIGURE 6-1
REVISED SAMPLE LOCATIONS
CONTAINMENT AREA #2

CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048
1-800-254-4381

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997

CSD Environmental Services, Inc.

2220 Yale Blvd.
Springfield, Illinois 62703
217/522-4085

SMS ENGINEERS
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CONSULTING ENGINEERS & LAND SURVEYORS

215 Market Street
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10 Central Industrial Dr
Northgate Center
Granite City, IL 62040
618/877-8700

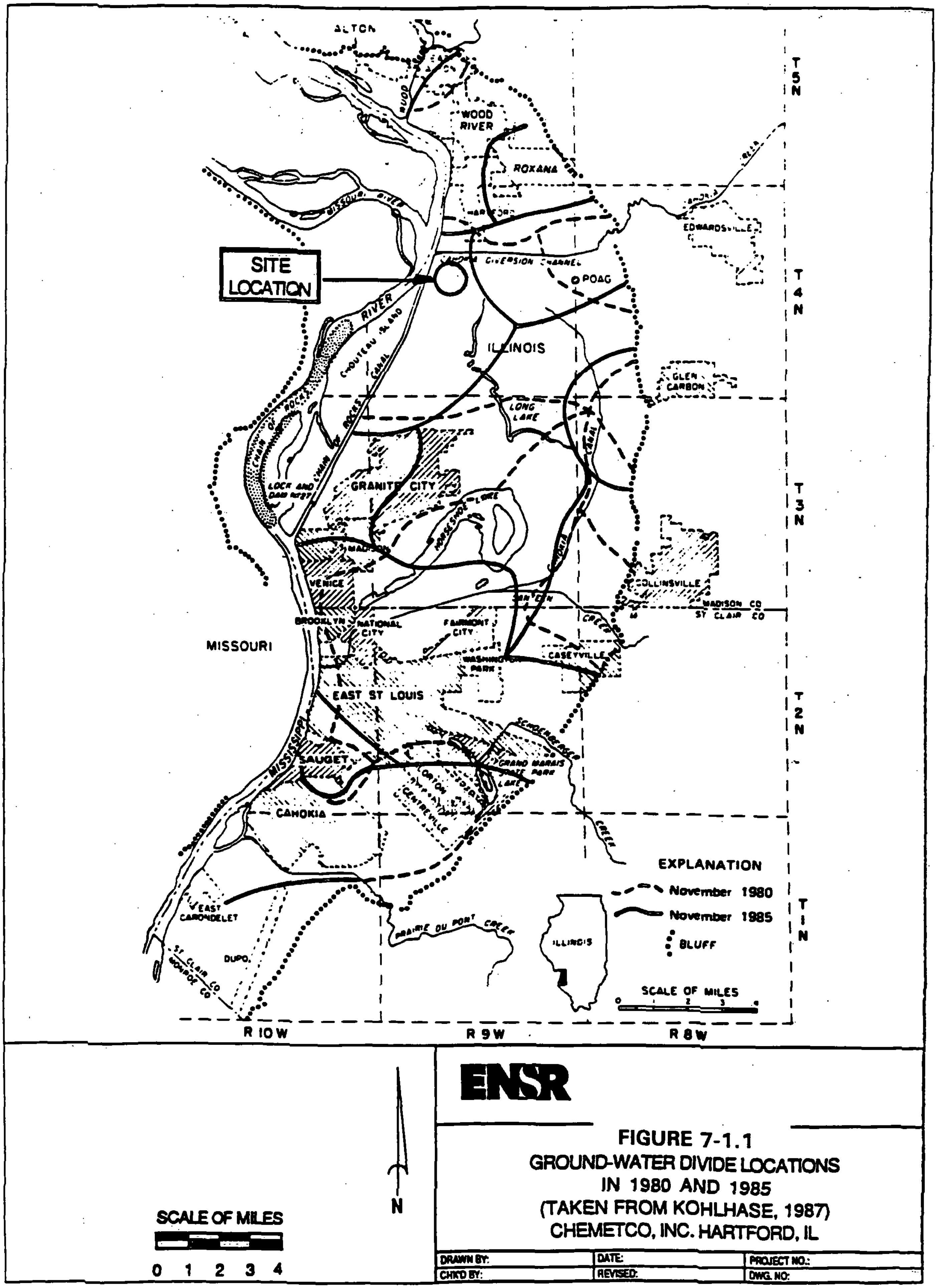

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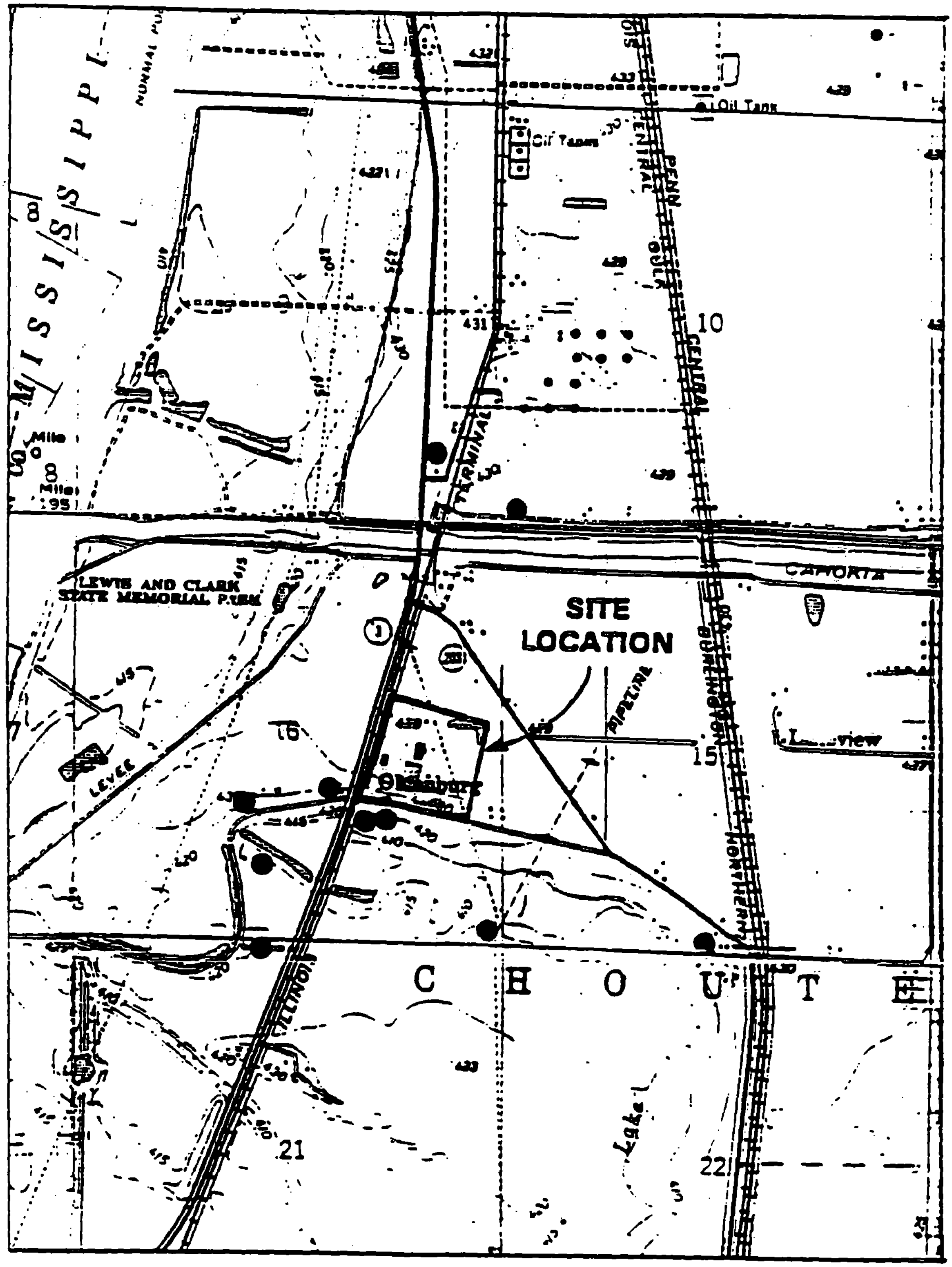
FIGURE 7-1.1
GROUND-WATER DIVIDE LOCATIONS IN 1980 AND 1985 (TAKEN FROM KOHLHASE, 1987)
CHEMETCO, INC. HARTFORD, IL

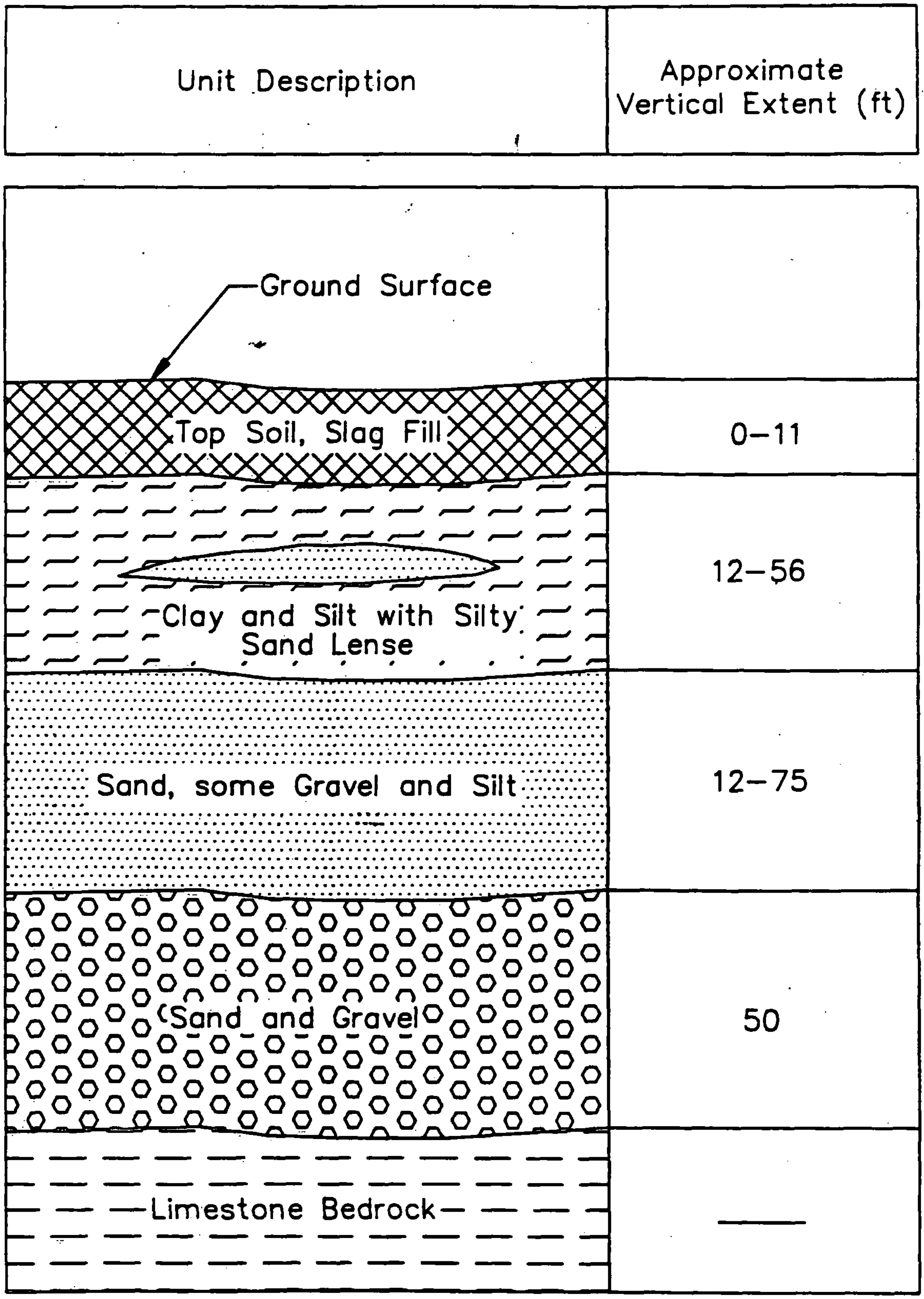
DRAWN BY:	DATE:	PROJECT NO.:
CHK'D BY:	REVISED:	DWG. NO:



LEGEND

● PRIVATE WELL LOCATION

FIGURE 7-1.2
PRIVATE WELL LOCATIONS WITHIN ONE MILE OF THE FACILITY

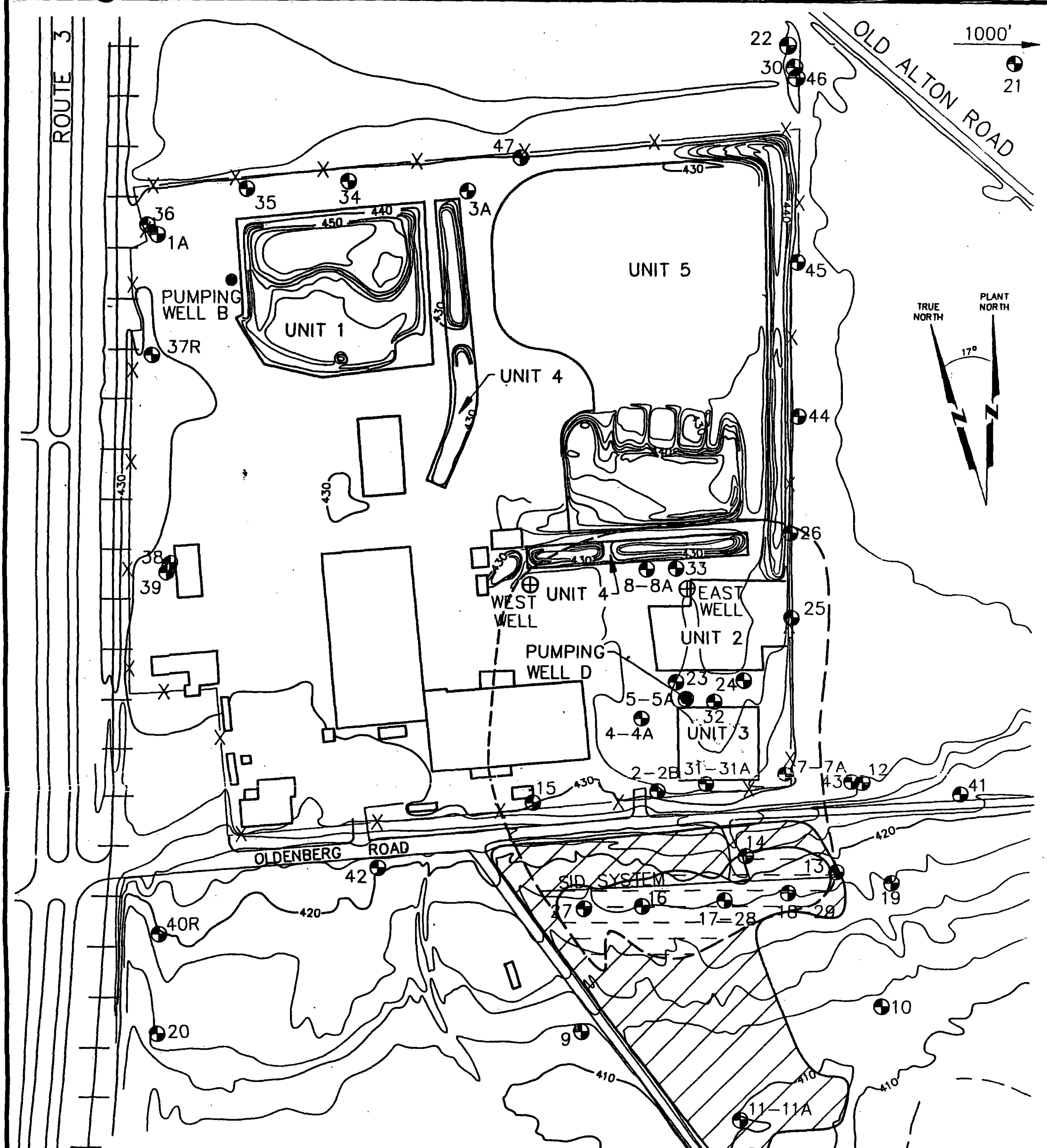


NOTE: VERTICAL EXTENT OF SLAG FILL
DOES NOT INCLUDE SLAG STORAGE AREAS.

FIGURE 7-2.1

GENERALIZED CONCEPTUAL GEOLOGIC COLUMN
CHEMETCO, INC. HARTFORD, IL

110071B



LEGEND

- STREAM
- ROAD
- FENCE
- RAILROAD
- SAND LENSE BOUNDARY
- MONITORING WELL
- PLANT WATER SUPPLY WELLS (LOCATIONS APPROXIMATE)
- REMEDIATION PUMP WELL
- STRESSED VEGATATION
- SAND LENSE OUTCROP AT LAND SURFACE

NOTE

WELLS 2,4,5,8,18,23,24 & 37 ARE ABANDONED

0 200 400

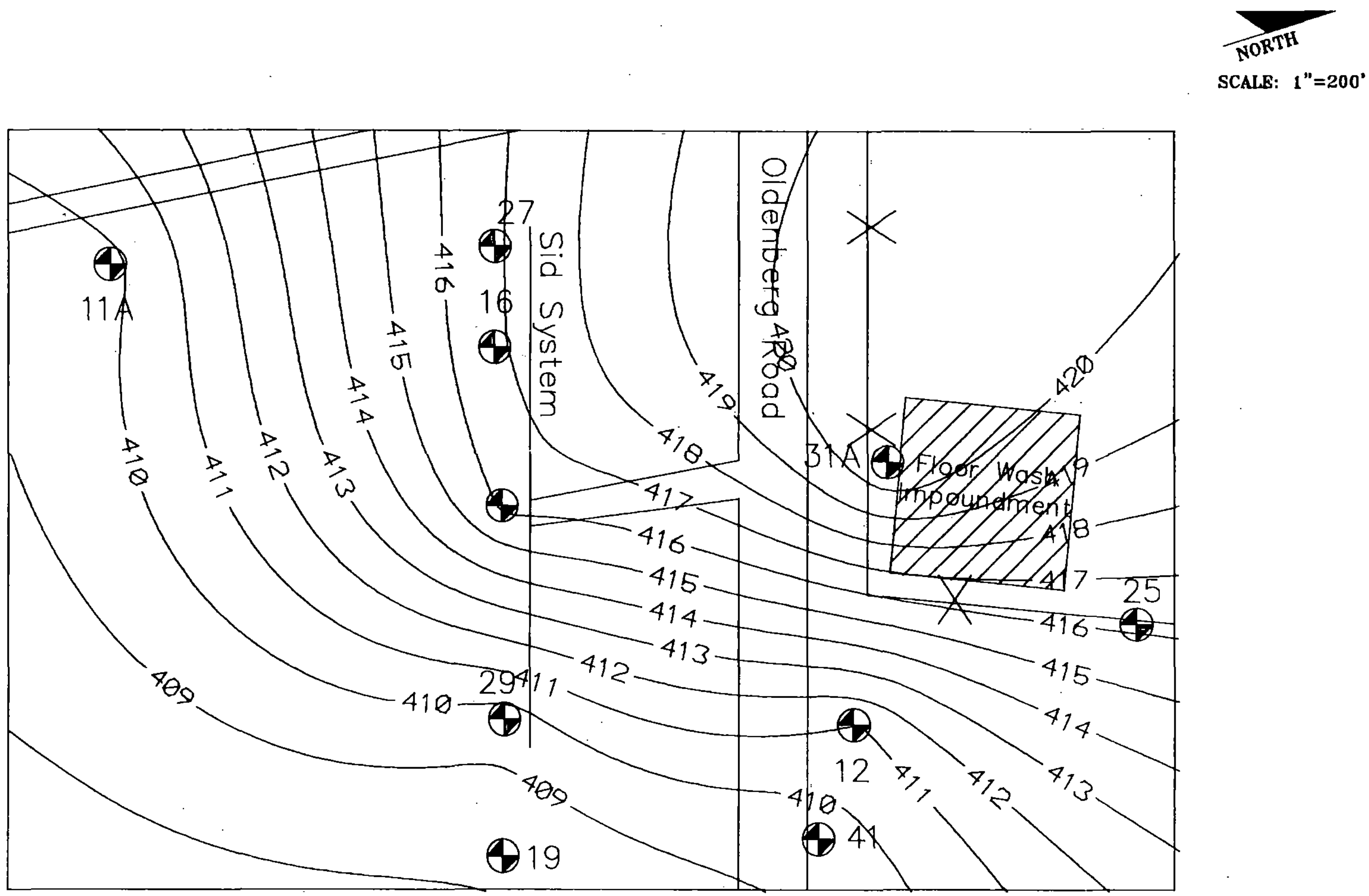
SCALE IN FEET
1" = 200'-0"

FIGURE 7-2.2

AREAL DISTRIBUTION OF SAND LENSE (PERCHED AQUIFER) WITHIN AQUITARD
CHEMETCO, INC.
HARTFORD, IL

ENSR

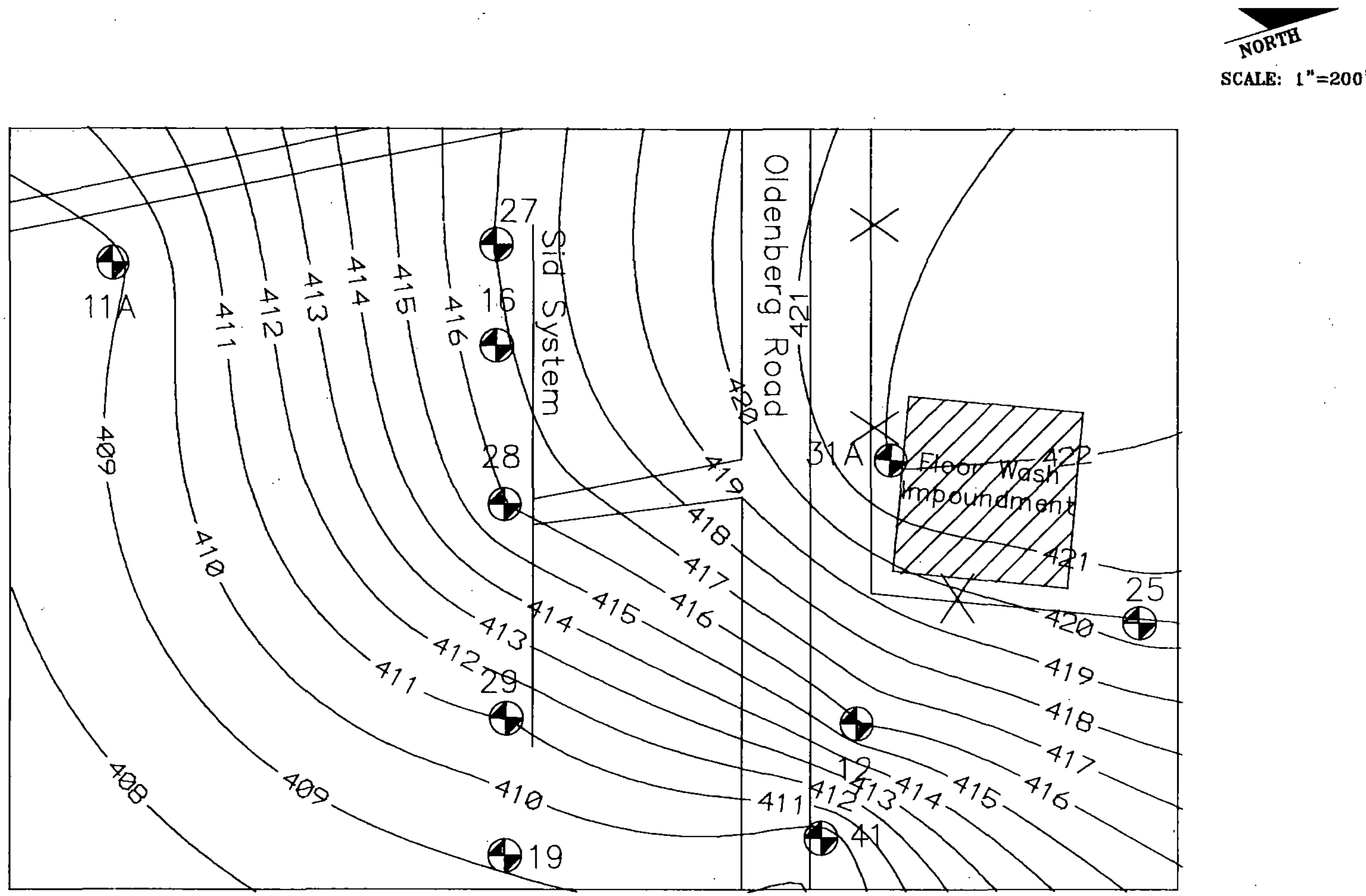
ENSR CONSULTING & ENGINEERING



CHEMETCO INC.
HARTFORD, IL.

FIGURE 7-3.1
GROUNDWATER FLOW DIRECTION
FOR THE SHALLOW AQUIFER
JANUARY 1996

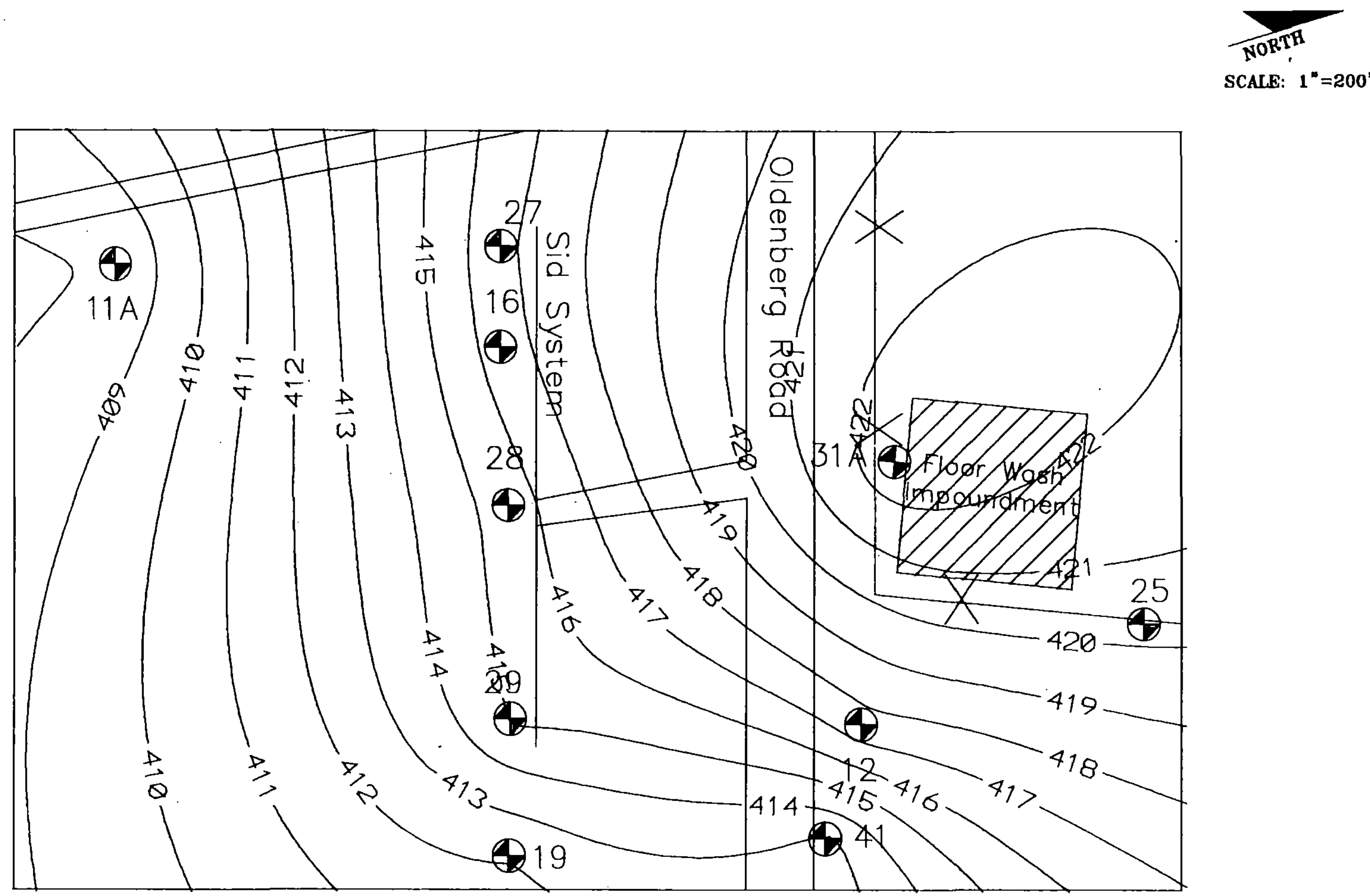
CSD ENVIRONMENTAL SERVICES



CHEMETCO INC.
HARTFORD, IL.

FIGURE 7-3.2
GROUNDWATER FLOW DIRECTION
FOR THE SHALLOW AQUIFER
APRIL 1996

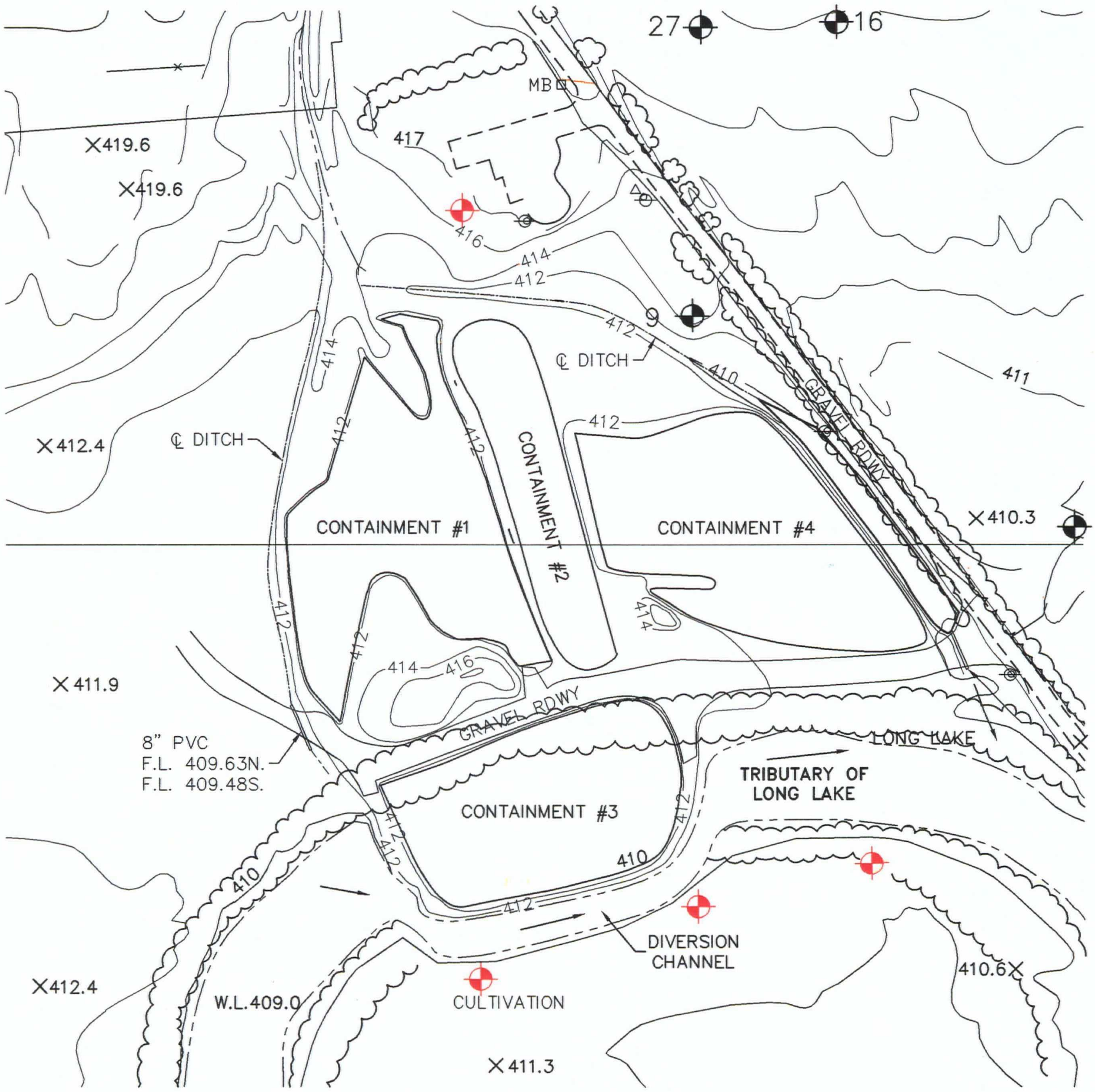
CSD ENVIRONMENTAL SERVICES, INC.



CHEMETCO INC.
HARTFORD, IL.

FIGURE 7-3.3
GROUNDWATER FLOW DIRECTION
FOR THE SHALLOW AQUIFER
JULY 1996

CSD ENVIRONMENTAL SERVICES



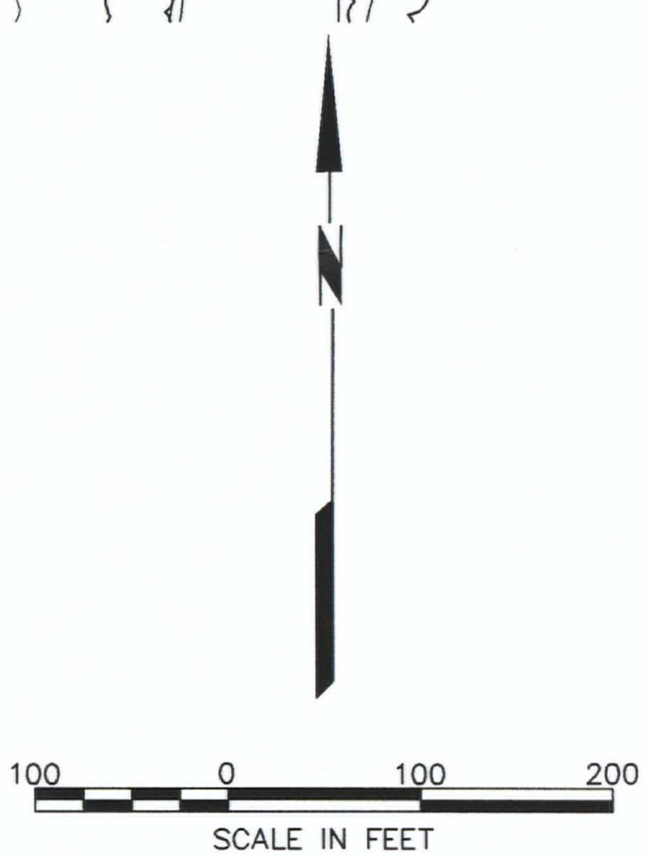


FIGURE 7–3.5
PROPOSED
MONITORING WELL LOCATIONS

CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048
1–800–254–4381

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997

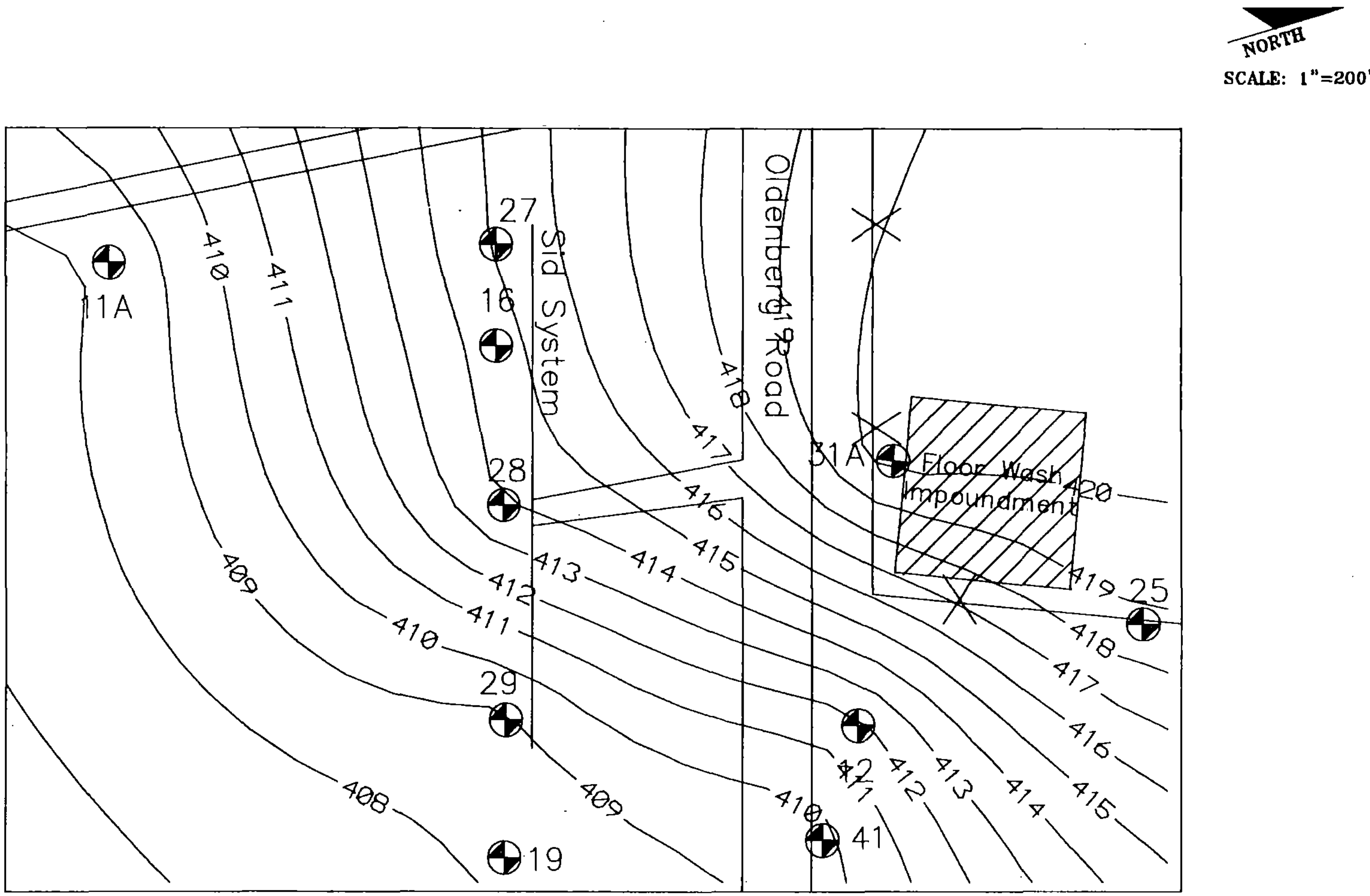
CSD Environmental Services, Inc.

2220 Yale Blvd.
Springfield, Illinois 62703
217/522–4085

SMS ENGINEERS
Sheppard Morgan & Schwaab, Inc.
CONSULTING ENGINEERS & LAND SURVEYORS

215 Market Street
P.O. BOX E
Alton, Illinois 62002
618/462–9755

10 Central Industrial Dr
Northgate Center
Granite City, IL 62040
618/877–8700



CHEMETCO INC. HARTFORD, IL.	FIGURE 7-3.4 GROUNDWATER FLOW DIRECTION FOR THE SHALLOW AQUIFER OCTOBER 1996	CSD ENVIRONMENTAL SERVICES, INC.

CSD Environmental Services, Inc.
Typical Well Construction Diagram

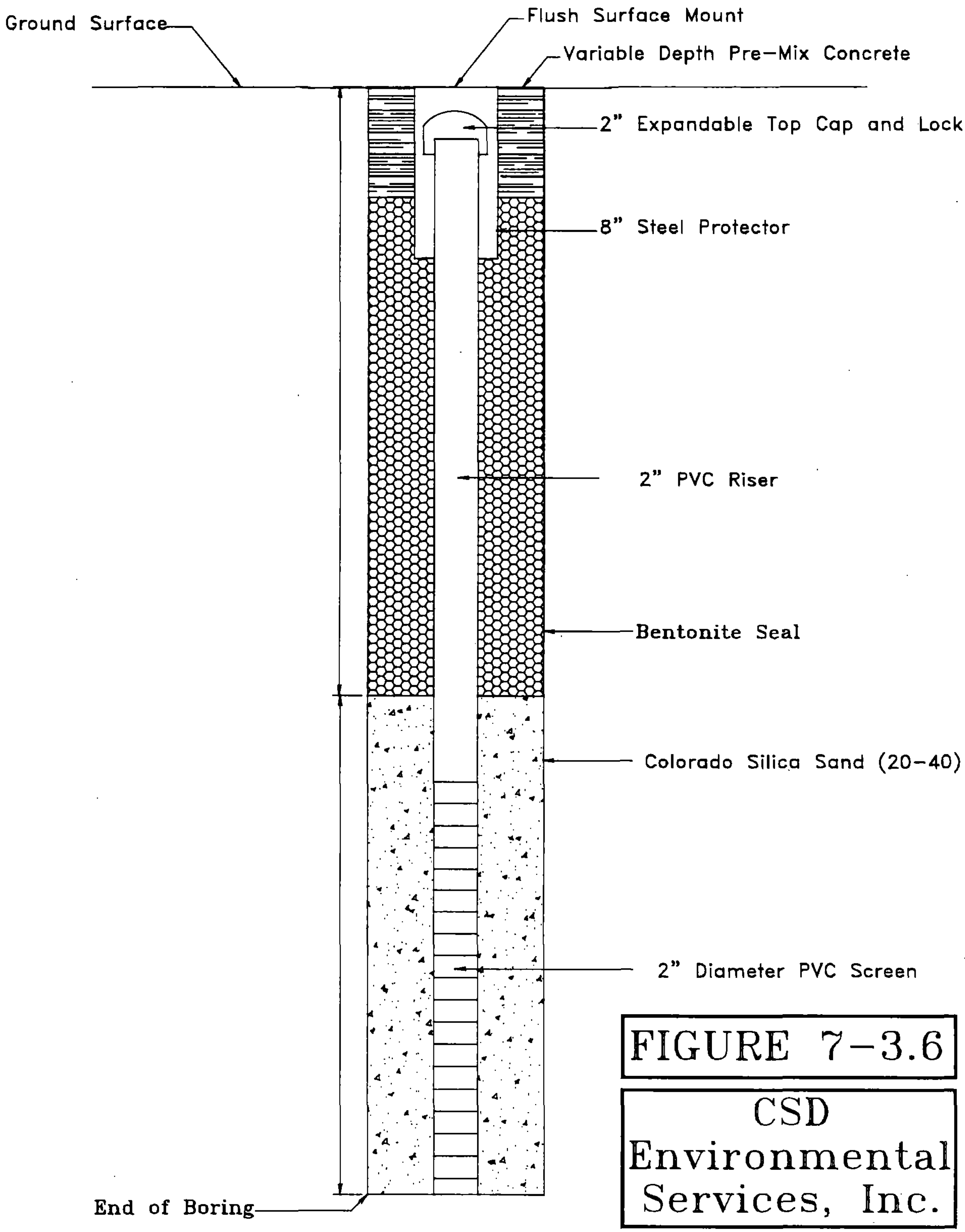


FIGURE 7-3.6

CSD Environmental Services, Inc.

FIGURE 7-3.7

LUST Incident No.:	Boring Number:	Page of
te Name: Address:	Boring Location:	Date: Start ____ Finish ____

Sample Number	Sample Recovery	OVA/PID/FID	Depth (feet)	Detailed Soil and Rock Description	ASTM Unified Soil Classification	Remarks

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data		
▼ Depth While Drilling ____ ▽ Depth After Drilling ____	Auger Depth ____ Rig Type ____ Rotary Depth ____ Driller ____ Geologist ____ Note: Boring backfilled unless otherwise noted.	CSD Environmental Services, Inc.

FIGURE 7–3.8

CSD Environmental Services LUST Well Completion Report

Incident No.: ______________________ Well No.: ______________________

Site Name: ______________________ Date Drilled Start: ______________________

Drilling Contractor: ______________________ Date Completed: ______________________

Driller: ______________________ Geologist: ______________________

Drilling Method: ______________________ Drilling Fluids (type): ______________________

Annular Space Details

Type of Surface Seal: ______________________

Type of Annular Sealant: ______________________

Type of Bentonite Seal (Granular, Pellet): ______________________

____

Type of Sand Pack: ______________________

Well Construction Materials

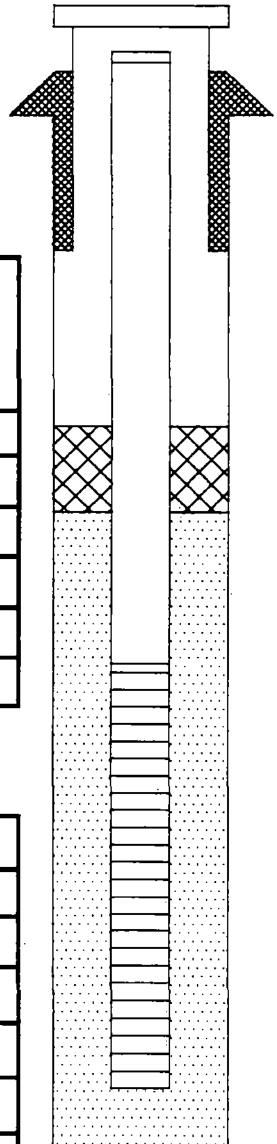
	Stainless Steel Specify Type	PVC Specify Type	Other Specify Type
Riser coupling joint			
Riser pipe above w.t			
Riser pipe below w.t.			
Screen			
Coupling joint screen to riser			
Protective casing			

Measurements

to .01 ft (where applicable)

Riser pipe length	
Screen length	
Screen slot size	
Protective casing length	
Depth to water	
Elevation of Water	
Free Product thickness	
Gallons removed (develop)	
Gallons removed (purge)	
Other	

Elevations–.01 ft.



________ Top of Protective Casing

________ Top of Riser Pipe

________ Ground Surface

________ Top of Annular Sealant

________ Casing Stickup

________ Top of Seal

________ Total Seal Interval

________ Top of Sand

________ Top of Screen

________ Total Screen Interval

________ Bottom of Screen

________ Bottom of Borehole

Completed by: ______________________

ATTACHMENT 1

Revised Work Plan - 10/10/96

CSD Environmental Services, Inc.

CHEMETCO, INC.
WORK PLAN FOR THE IMMEDIATE RESPONSE TO ZINC OXIDE SPILL
Revised October 10, 1996

Prepared by:

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

2220 Yale Blvd., Springfield, IL 62703 • Phone 217-522-4085 • FAX 217-522-4087

FILE COPY

CHEMETCO, INC.
WORK PLAN FOR THE IMMEDIATE RESPONSE TO ZINC OXIDE SPILL
Revised October 10, 1996

Prepared by:

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

CSD

Environmental Services Inc.

2220 Yale Boulevard
Springfield, IL 62703
(217) 522-4085

CSD Environmental Services, Inc.

October 15, 1996

Illinois Environmental Protection Agency
Field Operations
Bureau of Land
2009 Mall Street
Collinsville, IL 62234

RE: 1198010003--Madison County
Chemetco, Inc.
ILD048843809
FOS

Attention: Mr. Kenneth G. Mensing
Regional Manager

Dear Mr. Mensing:

Enclosed please find three (3) copies of the *Revised Work Plan for the Immediate Response to the Zinc Oxide Spill* at Chemetco. The Revised Work Plan addresses the comments provided by the Illinois Environmental Protection Agency (IEPA) on September 30, 1996. The IEPA comments are listed below as well as Chemetco's response.

1. **Chemetco must submit as-built scaled drawings of the impoundment area to the Agency.**

Figures 1 and 2 show to a scale of 1" = 150' the spill area and the containment areas.

2. **Chemetco must submit a new work plan containing a detailed description of the decontamination protocol at this site. The plan must include methods for disposal for decontamination of waste.**

A revised work plan is submitted under this cover addressing decontamination protocol and disposal methods.

3. **Inspections of the surface impoundment pursuant to 35 IL Adm. Code 724.115 and 724.326 must be conducted on a daily basis. Chemetco must have contingencies in place to respond to detections of leaks in the impoundment.**

The spill area has been divided into four separate containment areas. Daily inspections for freeboard and erosion will be conducted. Inspection records will be maintained at the facility. In case of leakage from one of the containment areas, the smaller containment areas were constructed within the original larger containment area. In the event one berm of the smaller areas is breached, a larger area will contain the material until the berm can be repaired.

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4. **To avoid making another regulated unit during clean-up, it is recommended that you obtain any necessary permits for waste disposal prior to initiating excavation activities. If it is necessary to store excavated soil and zinc oxide slurry waste on-site prior to disposal, do so only in containers or tanks for less than ninety days. Do not create regulated waste piles by storing hazardous waste in piles. The ninety (90) day accumulation time exemption (35 IAC 722.134) only applies to containers and tanks.**

No additional regulated units will be created during the removal and containment of the zinc oxide. It was necessary to separate the water from the zinc oxide, store the shredded vegetation, and stockpile contaminated limestone rock by creating smaller containment areas within the larger containment. However, no new units were created during this process since the entire larger containment area will undergo closure.

5. **Prevent further releases by capping the end of the 10 inch discharge pipe. Also locate the source of the discharge and insure that there are no further releases.**

The 10 inch pipe was sealed with a 10" PVC cap approximately 50' south of where is crosses Oldenberg Road. The valve on the south side of Oldenberg Road has been shut off. The pipe and valve will be removed up to the south side of Oldenberg Road and a permanent seal installed to prevent any further releases.

6. **The June 30, 1988 consent Order filed in the Circuit Court for the Third Judicial Circuit Madison County, Illinois states that zinc oxide that is placed on the land is not exempt from the requirements of the RCRA or State special waste requirements. Since the zinc oxide slurry discharge to the impoundment is characteristically hazardous for lead and cadmium, it must be managed as a hazardous waste. The waste removed from the impoundment must be sent to a facility with a USEPA Identification Number and must be permitted to accept the waste.**

Chemetco has characterized the spilled material and determined it is zinc oxide. Chemetco agrees if the material were to be left in the spill area, i.e. disposed, it would need to be managed as a hazardous waste. However, since the material can be recycled for further metal reclamation, as is the current zinc oxide produced, the material does not meet the definition of a solid waste under 35 Ill. Adm. Code, Part 721. Specifically, 721.102(e) states materials are not solid wastes when recycled if they can be returned to the original process from which they are generated, without first being reclaimed. The spilled zinc oxide can be sold to existing customers without further reclamation. The spilled zinc oxide has been secured and contained to prevent any further releases to the environment until this issue is resolved. Chemetco acknowledges the apparent disagreement regarding the management of the zinc oxide and is willing to work with the Agency towards resolution of this issue and has initiated discussions with the Illinois Attorney General's Office regarding the 1988 Consent Order.

7. **A detailed description of the dewatering process of the zinc oxide slurry in Chemetco's on-site filter presses must be submitted to the Agency before any dewatering takes place. This plan must include but not be limited to the following:**

   a) **Identify the cells which will be dedicated to the management of hazardous waste;**

b) **Describe the flow of waste through the dewatering process;**

c) **Provide a detailed description of how Chemetco will prevent the mixing of the current generation of zinc oxide with the zinc oxide removed from the impoundment. Chemetco must not mix the hazardous waste zinc oxide removed from the impoundment with the zinc oxide generated elsewhere in the plant;**

d) **All accumulation of the zinc oxide slurry must be done in containers or tanks in compliance with 35 IAC 722.134 and 728.**

At the current time, Chemetco is not anticipating using the on-site filter presses to dewater the zinc oxide. Instead the zinc oxide, will be dewatered by adding a drying agent such as lime in the field prior to loading into trucks. If in the event, Chemetco decides to use the on-site filter presses, the information requested above by the Agency will be submitted prior to the use of the tanks and presses.

8. **The Illinois Environmental Protection Agency must be contacted at 618/346-5120 two (2) days prior to sending any waste to the on-site filter presses or associated tanks for dewatering.**

The IEPA will be contacted two days prior to conducting any dewatering and/or shipment of the zinc oxide material.

9. **The Agency must inspect each cell prior to receiving any hazardous zinc oxide waste.**

See response to Item #7 above.

I trust this information along with the Revised Work Plan addresses all of the Agency's comments raised in the September 30, 1996 letter. If you have any questions please feel free to contact me at the number below.

Sincerely,

Cindy S Davis

Cindy S. Davis
President

cc: Greg Cotter, Chemetco
George von Stamwitz, Armstrong, Teasdale, Schlafly and Davis
IEPA - Emergency Response Unit

CHEMETCO, INC.
WORK PLAN FOR THE IMMEDIATE RESPONSE TO ZINC OXIDE SPILL
Revised October 10, 1996

Prepared by:

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

CHEMETCO, INC.
WORK PLAN FOR THE IMMEDIATE RESPONSE TO ZINC OXIDE SPILL
SEPTEMBER 25, 1996
Revised October 10, 1996

Prepared by: CSD ENVIRONMENTAL SERVICES, INC.
2220 Yale Boulevard
Springfield, IL 62703
217/522-4085
217/522-4087 (fax)

INTRODUCTION

An apparent spill of zinc oxide material was reported to the National Response Center and Illinois Emergency Management Agency on September 19, 1996. The spill was found during a routine RCRA Inspection conducted by the IEPA on September 18, 1996. Personnel from the United States Environmental Protection Agency (USEPA) were also present during the inspection. During the inspection, material that appeared to be zinc oxide was discharging from a pipe located south of Old Oldenberg Road. The IEPA and Chemetco, Inc. (Chemetco) collected samples of the water and of the sediment. Three sediment samples and one water sample were collected. Chemetco's samples were shipped to Environmental Analysis on the afternoon of September 18, 1996. Analysis was requested for total lead, cadmium, and zinc and TCLP on lead, cadmium and zinc. Sample results were received by Chemetco on September 27, 1996. Copies of the analytical results are provided as Attachment 1 to this work plan.

To ensure further releases from the pipe do not occur, a PVC plastic cap was temporarily placed over the end of the discharge pipe. The valve on the south side of Oldenberg Road has been shut off. The pipe and valve will be removed up to the south side of Oldenberg Road and a permanent seal installed to prevent any further releases.

This work plan addresses the temporary containment and removal of the apparent zinc oxide material. CSD Environmental Services, Inc. (CSD) has confirmed the release is confined to Chemetco's property. The work plan will be carried out in three phases. The first phase will focus on containment, the second phase will focus on dewatering of the area, and the final phase will be removal of the zinc oxide. A separate plan will be submitted proposing sampling locations, parameters, etc., for the closure of the incident.

PHASE I - CONTAINMENT

Initially a diversion channel was constructed to reroute the lake past the spill area. A Section 404 Permit, of the Clean Water Act (CWA), was required by the Army Corp of Engineers (Corps) to reroute the lake. A permit application was faxed to the Corps on Friday, September 20, 1996 with a request to begin construction on Saturday, September 21. The application consisted of a drawing Figure 1 showing the impacted area, the location of all proposed dams, and the diversion channel.

The following steps were conducted to achieve containment:

1. A road was constructed from the west side of the private lane to the west dam (see Figure 1 attached). This road was constructed using limestone rock. The road started at a height of about 2 feet at the private lane and gradually increased to about 5 feet at the west dam. The total length of this road was about 300 feet. Later the road was extended to intercept the south portion of the truck parking lot. This allows heavy equipment and trucks to enter the spill area without backing up. This will expedite the dewatering and removal of the zinc oxide material. This road is called the rock road/dam.

2. The north side of the rock road/dam was lined with 8 to 10 millimeter thickness polyethylene plastic to inhibit water from flowing under and reaching Long Lake. Limestone rock, was placed on top of the liner to hold it in place.

3. An earthen berm was constructed approximately 3 to 5 feet in height around the entire perimeter of the spill area. A drainage ditch was constructed to divert surface water to Long Lake around the impacted area.

4. A diversion channel 25 feet wide by 3 to 5 feet in depth was constructed to reroute water in Long Lake around the spill area.

5. Two dams were constructed on Long Lake to help in the diversion. The east dam is approximately 10 to 12 feet wide. The west dam is approximately 15 feet wide. Clean soil from the construction of the diversion channel was used to construct the dams.

PHASE II-DEWATERING

To separate the water and zinc oxide and allow heavy equipment access, two new berms within the containment area were necessary. Two containment areas were made, Containment Area #1 for storage of zinc oxide and Containment Area #2 for water. Refer to Figure 2 for the location of the containment areas. The containment areas will be inspected daily to monitor freeboard levels and erosion. Inspection records will be maintained at the facility. The smaller containment areas are constructed within the larger containment. In the event one berm of the smaller areas is breached, a larger area will contain the material.

Zinc oxide was pushed by a bulldozer into Containment Area #1 to allow construction of Area #2. Water was removed from Long Lake and the southwest corner of Containment Area #1 by excavating holes and placing a slotted 55 gallon drums in each. The purpose of the drums was to prevent solids from reaching the portable pumps used to transfer the water into Containment Area #2.

PHASE III-REMOVAL

Zinc oxide will be removed from Containment Area #3 - Long Lake first, followed by either Containment Area #1 or 2. Containment Area #4 does not contain any visible zinc oxide. Refer to Figure 2 for the location of the containment areas.

A. CONTAINMENT AREA #1

Zinc oxide will be removed by either pumping it to the southwest corner of Containment Area #1 or mixing it with a drying agent to enable excavation. A decision on the type of removal will be made based upon the moisture content of the zinc oxide material and economic and environmental considerations. The two processes are described below.

1. Slurry Method - The zinc oxide will be collected in a sump. The sump will have a screen placed over it to screen out foreign objects such as trees, roots, etc. The slurry will be handled in one of the following manners:

   a. The slurry will be placed in a tanker truck and transported to Chemetco's plant. The slurry will be directly unloaded into a tank to separate the water and zinc oxide. The slurry will be routed to a filter press for further dewatering. The decanted water will be routed to the polish pits and used for cooling tower make up water. The filter cake will be sold for further reclamation.

   b. The slurry will be pumped into a temporary tank and filter press set up at the containment area. Filter cake will be loaded into a roll off box and water will be routed back to Containment Area #2 for further handling as identified in Item a above. The filter cake will be sold for further reclamation

2. Use of a drying agent - "Code L Lime", a special type of lime used by the Illinois Department of Transportation for dewatering purposes, will be mixed with the zinc oxide to remove moisture. Once the material to passes the paint filter test it will be transported for further reclamation. An MSDS sheet for "Code L Lime" is provided as Attachment 2. A test was conducted on Friday, October 4, 1996 to determine if "Code L Lime" is an effective drying agent. Two yards of "Code L Lime" was mixed with approximately 10 yards of zinc oxide in Containment Area #2. The "Code L Lime" was proved effective in reducing the moisture in the zinc oxide.

   A field pilot test was also conducted to determine the best drying agent for reducing the leachability of lead and cadmium in zinc oxide. Further treatment of the soil, after the zinc oxide is removed, may be necessary to meet clean up objectives. The test was conducted using both lime and triple super phosphate (common fertilizer). Before beginning the test a sample (E-1), was collected of the pure zinc oxide. The first test was conducted using only lime as a drying agent. Lime and zinc oxide were mixed using a ratio of 25% lime and 75% zinc oxide. Sample (E-2) was then collected from this mixture for analyses. The second test consisted of mixing super triple phosphate with the zinc oxide and lime mixture at a ratio of 75% lime and zinc oxide to 25% triple super phosphate. A sample of the mixture (E-3) was then collected. All samples were analyzed for TCLP lead, cadmium and zinc. The samples were hand delivered to Prairie Analytical Systems in Springfield for rush analysis. Sample results showed triple super phosphate was very effective in binding the lead, cadmium and zinc. Treatment of the soil with triple super phosphate to bind the remaining metals may be an option. Sample results are provided in Attachment 3.

After all the visual zinc oxide is removed, sampling will be conducted for closure in accordance with the sampling and analysis plan discussed in Phase III - Section G.

B. CONTAINMENT AREAS 2 AND 4

Water in Containment Area #2 will be sampled to determine if it meets the existing NPDES discharge requirements. If the water meets the requirements, it will be pumped to the permitted outfall area for discharge. If the water does not meet the requirements, it will be transported to the plant for use as cooling tower make up water. After the water is removed from Containment Area #2, any visible zinc oxide will be removed and placed into Containment Area #1. Sampling will be conducted in Containment Areas 2 & 4 for closure in accordance with the sampling and analysis plan discussed in Phase III - Section G.

C. LONG LAKE - CONTAINMENT AREA #3

Before removing of the zinc oxide from Long Lake, two rock pads will be placed south of the rock road/dam to allow a trackhoe access across Long Lake. The trackhoe will remove all impacted vegetation and place it on the rock road/dam where another trackhoe will transport it to the shredder. The shredder will be located within the containment area. After the vegetation is removed and the lake is dewatered, the trackhoe will scrape the zinc oxide from Long Lake toward the rock road/dam. The trackhoe will place the zinc oxide into Containment Area #2. After all the visual zinc oxide is removed, sampling will be conducted for closure. If the sample results indicate the remaining soils are below the applicable objectives, the two rock pads will be removed. The rock forming the rock pads will be inspected and any affected rock will be washed at the decontamination pad to allow further use. The soil beneath the pads will be removed and placed into containment area #2. After all the visual zinc oxide is removed, sampling will be conducted for closure in accordance with the sampling and analysis plan discussed in Phase III - Section G.

D. VEGETATION REMOVAL

A large portion of the spill area contained dense vegetation such as trees, shrubs, and plants. The vegetation was removed and fed into a grinder. The shredded material will be stored within the containment area. We anticipate using the material to help dry the zinc oxide. If this is not possible, the material will be mixed with the soil and disposed.

E. DECONTAMINATION PROCEDURES

All equipment will be decontaminated by high pressure steam cleaning following gross removal by scraping. All decontamination will be conducted on a decontamination pad constructed at the east edge of the rock dam/road. Refer to the Figure 2 for the location of the decontamination pad. All personnel entering the contaminated area must go through decontamination before entering a clean area in accordance with the Site Health & Safety Plan. All decontamination rinse waters and solids will be collected in a sump and transported to the containment area to be handled as the waste present in those areas.

F. DISPOSAL OPTIONS

The zinc oxide recovered from Long Lake and Containment Area #2 will be handled in the same manner as Chemetco's existing zinc oxide filter cake. The zinc oxide will be sold to existing customers for further metal reclamation.

G. CLOSURE

A sampling and analysis plan will be submitted to the IEPA for review. After concurrence from the IEPA of the plan is received sampling and analyses will be conducted and the results submitted to the IEPA. At the completion of the remediation, a closure plan will be submitted to the IEPA, Bureau of Land.

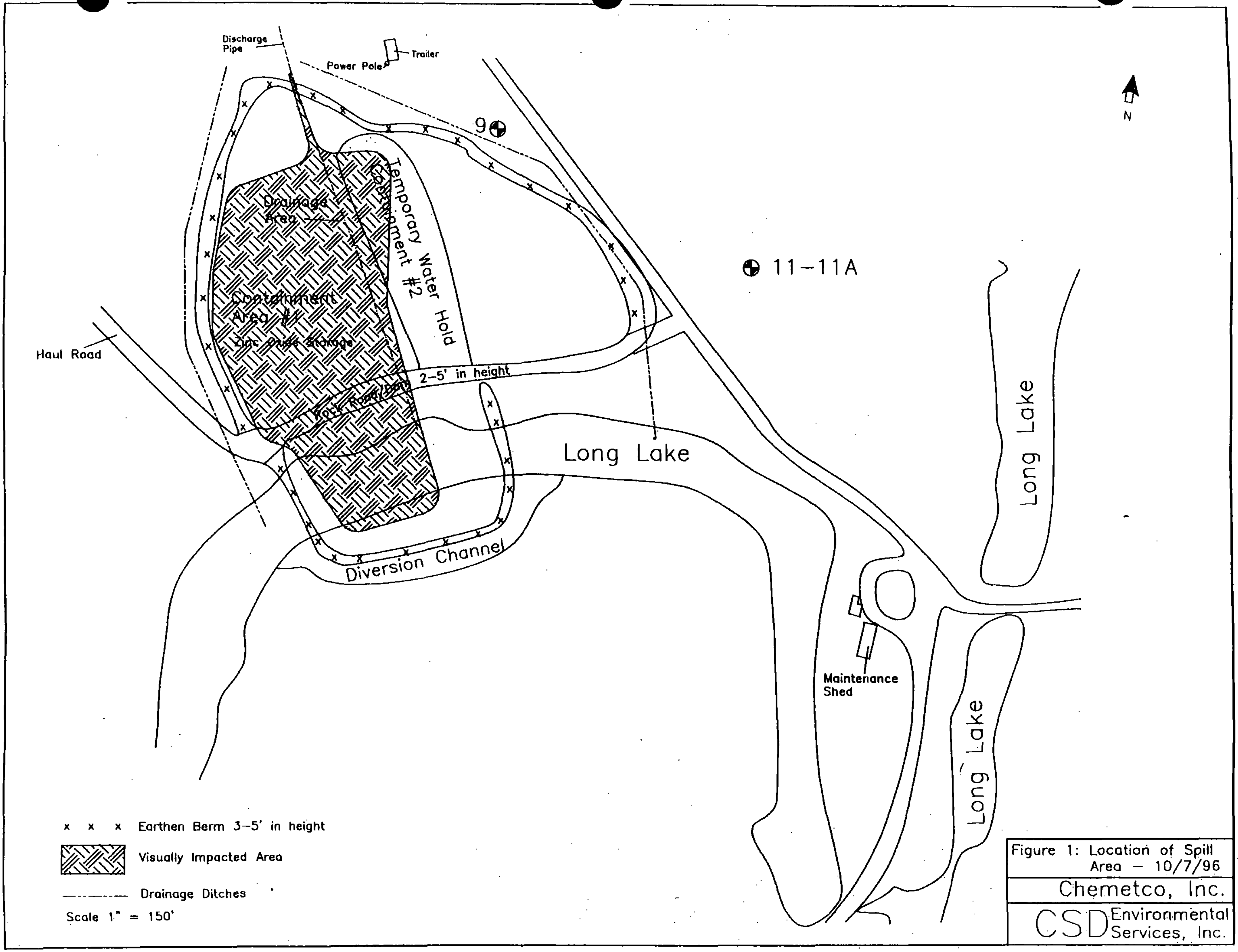


Figure 1: Location of Spill Area – 10/7/96

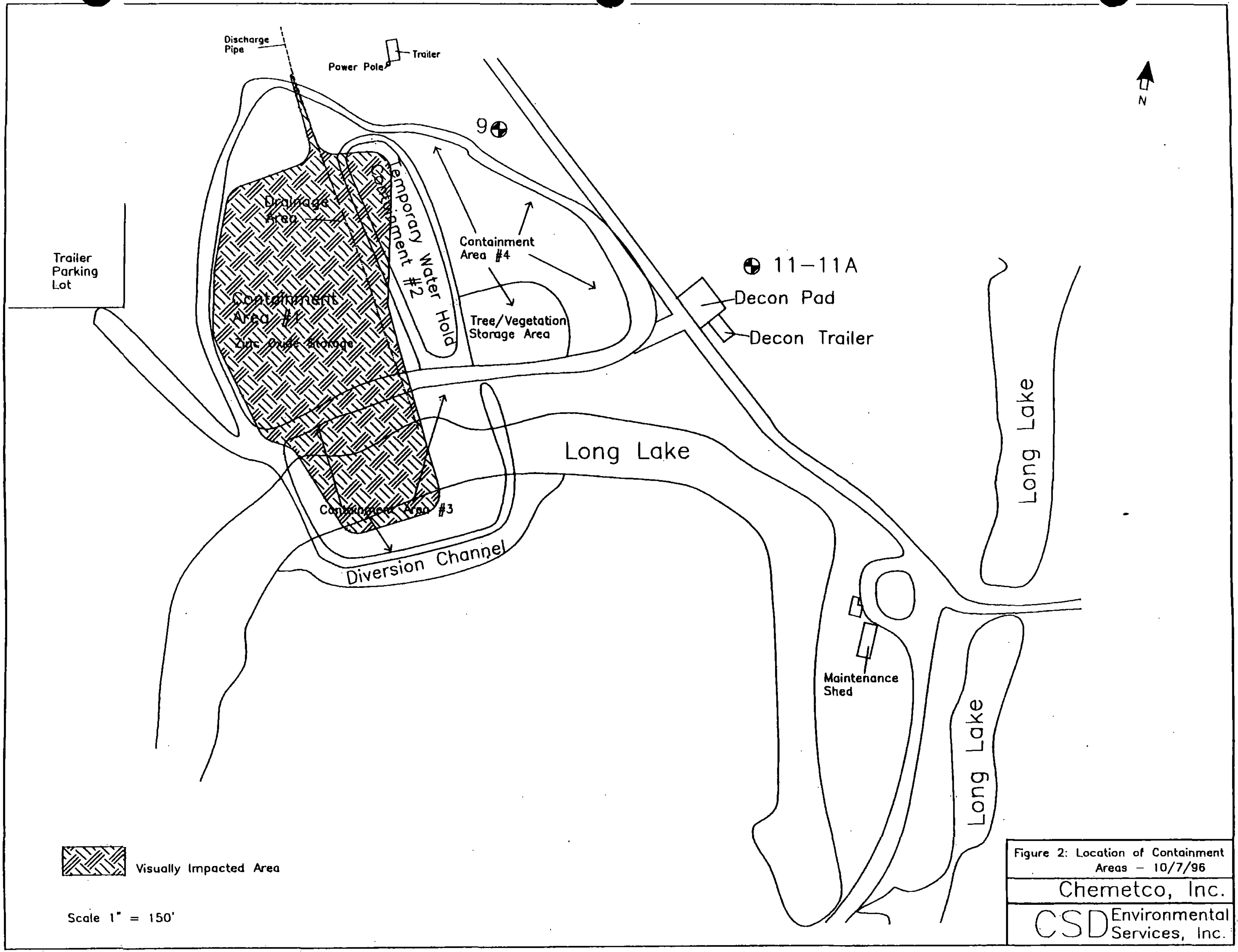


Figure 2: Location of Containment Areas – 10/7/96

Chemetco, Inc.

CSD Environmental Services, Inc.

ATTACHMENT 1
SAMPLE RESULTS FROM ENVIRONMENTAL ANALYSIS

TEST RESULTS REPORT
FOR CHEMETCO

LOG NUMBER	SAMPLE DESCRIPTION	RESULTS OF ANALYSIS	UNITS OF MEASURE
1815410	X101 c		
	SAMPLE DATE:09/18/96		
	TCLP Lead	428	mg Pb/l
	TCLP Cadmium	26.8	mg Cd/l
	TCLP Zinc	1740	mg Zn/l
	Total Metals Prep for solids	1	
	Lead	3.10	% w/w
	Cadmium	754	ug/g
	Zinc	6.11	% w/w
	pH Value	8.25	10% Soln
	TC Leaching Proc.	Vol.55,#61	Fed.Reg.
	Total Metals Prep/Microwave	09/25/96	
1815411	X102 c		
	SAMPLE DATE:09/18/96		
	TCLP Lead	76.2	mg Pb/l
	TCLP Cadmium	18.7	mg Cd/l
	TCLP Zinc	2920	mg Zn/l
	Total Metals Prep for solids	1	
	Lead	4.66	% w/w
	Cadmium	799	ug/g
	Zinc	8.28	% w/w
	pH Value	8.63	10% Soln
	TC Leaching Proc.	Vol.55,#61	Fed.Reg.
	Total Metals Prep/Microwave	09/25/96	
1815412	X103 c		
	SAMPLE DATE:09/18/96		
	TCLP Lead	191	mg Pb/l
	TCLP Cadmium	27.4	mg Cd/l
	TCLP Zinc	2800	mg Zn/l
	Total Metals Prep for solids	1	
	Lead	5.71	% w/w
	Cadmium	1254	ug/g
	Zinc	10.7	% w/w
	pH Value	8.85	10% Soln
	TC Leaching Proc.	Vol.55,#61	Fed.Reg.
	Total Metals Prep/Microwave	09/25/96	
1815413	S001 c		
	SAMPLE DATE:09/18/96		
	Cadmium	2.44	mg Cd/l
	Zinc	6.78	mg Zn/l
	Total Metals Prep/GTF AA	09/26/96	
	Lead	4.15	mg Pb/l
	Total Metals Prep/Microwave	09/25/96	

ATTACHMENT 2
MSDS SHEET FOR CODE L LIME

MISSISSIPPI LIME COMPANY - MATERIAL SAFETY DATA SHEET
OSHA HAZARD COMMUNICATION

PRODUCT IDENTIFICATION	CHEMICAL ABSTRACT NUMBER	DATE PREPARED
Code L	*MIXTURE*	08-May-95

Section I

Manufacturer	24 Hour Emergency Contact Number	HMIS RATING
Mississippi Lime Company P.O. Drawer 81 Highway 61 Ste. Genevieve, MO 63670	(800) 437-5463 Telephone Number for Information (800) 437-5463	Health 3 Flammability 0 Reactivity 2 *Protective Equip.* E
	Signature of Preparer *Mark G. DeSena*	

Section II - Hazardous Ingredients / Identity Information

Hazardous Components (Specific Chemical Identity; Common Names)		OSHA PEL	ACGIH TLV	Other Limits Recommended	% (Optional)
Calcium Oxide; Quicklime	CAS 1305-78-8	5 mg/m³	2 mg/m³		to 45 %
Calcium Hydroxide	CAS 1305-62-0	5 mg/m³	5 mg/m³		to 85 %
Crystalline Silica (Quartz)	CAS 1408-60-7	0.1 mg/m³	0.1 mg/m³		(0.1 to 0.5 %)

Code L is not listed on the NTP, IARC, or OSHA lists of carcinogens. Crystalline silica, a component of this product, is listed by IARC and NTP but not by OSHA. IARC classifies crystalline silica as "*probably carcinogenic to humans*" on the basis that there is limited evidence for carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals. "Limited evidence" means that a causal relationship is possible; however, other explanations such as a chance, bias or confounding factors cannot adequately be excluded. NTP also classifies crystalline silica on the basis of limited evidence as "*a substance which may reasonably be anticipated to be a carcinogen*" (Rev. 11/93).

Section III - Physical / Chemical Characteristics

Boiling Point (Calcium Oxide)	5162 °F	Specific Gravity (H_2O = 1)	3.00
Vapor Pressure (mm Hg)	NA	Melting Point	1076 °F
Vapor Density (Air = 1)	NA	Evaporation Rate	NA
Solubility in Water		0.2 % @ 0 °C	
Appearance and Color		Tan powder, odorless	

Section IV - Fire and Explosion Hazard Data

Flash Point	NA	Flammable Limits-	NA
Extinguishing Method	NA		
Special Fire Fighting Procedures	NA		
Unusual Fire and Explosion Hazards	NA		

Section V - Reactivity Data

Stability	Unstable		Conditions to Avoid -	NA
	Stable	X		
Incompatibility (Materials to Avoid)			Acids, Fluorine	
Hazardous Decomposition or Byproducts			None	
Hazardous Polymerization	May Occur		Conditions to Avoid -	NA
	Will Not Occur	X		

MISSISSIPPI LIME COMPANY - MATERIAL SAFETY DATA SHEET
OSHA HAZARD COMMUNICATION

PRODUCT IDENTIFICATION	CHEMICAL ABSTRACT NUMBER	DATE PREPARED
Code L	*MIXTURE*	*05-May-95*

Section VI - Health Hazard Data

Route(s) of Entry	Inhalation?	YES	Skin?	YES	Ingestion?	YES

Health Hazards	Acute	Corrosive to skin and eyes. Causes irritation and inflammation to mucous membrane and respiratory passages.
	Chronic	Long term exposure can cause irritation, ulceration and perforation of nasal septum.

Carcinogenicity	NTP?	IARC Monographs?	OSHA Regulated ?
Oxide and Hydroxide	NO	NO	NO
Crystalline Silica	YES	YES	Not as a carcinogen

Signs and Symptoms of Exposure	Irritation of skin, eyes, and respiratory tract.
Medical Conditions Generally Aggravated by Exposure	Respiratory disease, skin condition.
Emergency and First Aid Procedures	Remove to fresh air. Wash dust with soap and water. Flush out eyes with generous amounts of water. Drink plenty of water if swallowed. See Physician.

Section VII - Precautions for Safe Handling

Steps To Be Taken in Case Material is Released or Spilled	Normal clean-up procedures. Care should be taken to avoid causing dust to become airborne. Vacuum cleaning systems are recommended.
Waste Disposal Method	Dispose of in accordance with Federal, State and Local regulations.
Precautions to Be Taken in Handling	Store away from incompatible substances
Other Precautions	None

Section VIII - Control Measures

Respiratory Protection

Dust filter mask

Ventilation	Local Exhaust -	To Maintain TLV's and PEL's	Special -	NA
	Mechanical -	To Maintain TLV's and PEL's	Other -	NA

Protective Gloves

Leather or Rubber

Eye Protection

Well fitted goggles

Other Protective Clothing

Long sleeve shirts and pants.

Work / Hygienic Practices

Maintain dust exposure limits below TLV's and PEL's. If not possible use respiratory protection.

Section IX - Transportation

Not regulated by Department of Transportation unless product is shipped by air.

ATTACHMENT 3
SAMPLE RESULTS FROM PRAIRIE ANALYTICAL SYSTEMS, INC.

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 25 September 1996
Date Received: 26 September 1996
Date Analyzed: 27 September 1996
Date Reported: 27 September 1996

Project: Chemetco

PAS Project Code: CSD-120

Sample Description:	E-1	E-2	E-3
PAS Sample No.:	9609263995	9609263996	9609263997

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.004	26.5	21.3	2.22	6010A
Lead	0.042	195	80.1	0.20	6010A
Zinc	0.002	1083	801	49.7	6010A

Miscellaneous Analysis

Parameters	Detection Limit	Result	Result	Result	E.P.A. Method
pH (Units)	—	8.63	8.26	4.72	9045B

Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Form PAS-TCLPM

PRINTED WITH SOY INK

Chain of [illegible]tody Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD Environmental	Project	Chemetco
Address	2220 Yale Blvd.	Contact Person	Marc Simmering
City, State, Zip	Springfield, IL 62703	P. O. #/ Invoice to:	
Phone Number	522-4085	Facsimile Number	

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling Date	Sampling Time	Container Size	Container No.	Preser-vative	Analysis Requested	PAS Sample Number
E-1		9/25	3:00p	4oz	1		pH, TCLP (Pb, Cd, Zn)	3995
E-2		"	3:20p	"	1		"	3996
E-3		"	3:38p	"	1		"	3997
W-1		"	4:22p	500ml	1		" total Pb, Cd, Zn per Harry C. 9/26/96 9:05am	3998

Relinquished by: Shawn A Thorpe		Received by: Sarah A Tuft	
Date: 9/26/96	Time: 9:00 am	Date: 9/26/96	Time: 9:00 am
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-120

Form PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Smapler

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 25 September 1996
Date Received: 26 September 1996
Date Analyzed: 27 September 1996
Date Reported: 27 September 1996

Project: Chemetco

PAS Project Code: CSD-120

Sample Description: W-1

PAS Sample No.: 9609263998

Total Metal Analysis

Analytes	Detection Limit mg/l	Result mg/l	E.P.A. Method
Cadmium, Total	0.004	1.09	6010A
Lead, Total	0.042	0.64	6010A
Zinc, Total	0.002	2.59	6010A

Miscellaneous Analysis

Parameters	Detection Limit	Result	E.P.A. Method
pH (Units)	—	8.29	9040A

Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

ATTACHMENT 2

Corp of Engineers Permit

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

2200 Churchill Road, Springfield, IL 62794-9276

217/782-0610

September 24, 1996

St. Louis District
Corps of Engineers
122 Spruce Street
St. Louis, Missouri 63103

Re: Chemetco (Madison County)
Cleanup of zinc oxide
Log # C-1318-96 [CoE appl. #]

Gentlemen:

This Agency received a request on September 20, 1996 from Chemetco requesting necessary comments concerning the cleaup operations due to a zinc oxide spill in Hartford. We offer the following comments.

Based on the information included in this submittal, it is our engineering judgment that the proposed project may be completed without causing water pollution as defined in the Illinois Environmental Protection Act, provided the project is carefully planned and supervised.

These comments are directed at the effect on water quality of the construction procedures involved in the above described project and are not an approval of any discharge resulting from the completed facility, nor an approval of the design of the facility. These comments do not supplant any permit responsibilities of the applicant toward the Agency.

This Agency hereby issues certification under Section 401 of the Clean Water Act (PL 95-217), subject to the applicant's compliance with the following conditions:

1. The applicant shall not cause:

   a. violation of applicable water quality standards of the Illinois Pollution Control Board, Title 35, Subtitle C: Water Pollution Rules and Regulation;

   b. water pollution defined and prohibited by the Illinois Environmental Protection Act; or

   c. interference with water use practices near public recreation areas or water supply intakes.

2. The applicant shall provide adequate planning and supervision during the project construction period for implementing construction methods, processes and cleanup procedures necessary to prevent water pollution and control erosion.

3. Any spoil material excavated, dredged or otherwise produced must not be returned to the waterway but must be deposited in a self-contained area in compliance with all state statutes, regulations and permit requirements with no discharge to waters of the State unless a permit has been issued by this Agency. Any backfilling must be done with clean material and placed in a manner to prevent violation of applicable water quality standards.

4. All areas affected by construction shall be mulched and seeded as soon after construction as possible. The applicant shall undertake necessary measures and procedures to reduce erosion during construction. Interim measures to prevent erosion during construction shall be taken and may include the installation of staked straw bales, sedimentation basins and temporary mulching. All construction within the waterway shall be conducted during zero or low flow conditions. The applicant shall be responsible for obtaining an NPDES Storm Water Permit prior to initiating construction if the construction activity associated with the project will result in the disturbance of 5 (five) or more acres, total land area. An NPDES Storm Water Permit may be obtained by submitting a properly completed Notice of Intent (NOI) form by certified mail to the Agency's Division of Water Pollution Control, Permit Section.

5. The applicant shall implement erosion control measures consistent with the "Standards and Specifications for Soil Erosion and Sediment Control" (IEPA/WPC/87-012).

6. The channel relocation shall be constructed under dry conditions and stabilized to prevent erosion prior to the diversion of flow.

7. Clean material shall be used for the dam construction.

8. All spoil material excavated shall be disposed in accordance with 35 Ill. Adm. Code, Subtitle G. The applicant shall provide analytical results of the contaminated excavated spoil material to the Illinois EPA, Division of Land Pollution Control for approval prior to disposal.

This certification becomes effective when the Department of the Army, Corps of Engineers, includes the above condition #1 through # 8 as conditions of the requested permit issued pursuant to Section 404 of PL 95-217.

This certification does not grant immunity from any enforcement action found necessary by this Agency to meet its responsibilities in prevention, abatement, and control of water pollution.

Very truly yours,

Thomas G. McSwiggin /by [signature]

Thomas G. McSwiggin, P. E.
Manager, Permit Section
Division of Water Pollution Control
TGM:BY:VMK:13180924.96c
cc: IEPA, Records Unit
IEPA, DWPC, FOS, Collinsville
IDNR, OWR, Springfield
USEPA, Region 5
Chemetco
CSD Environmental

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

REPLY TO
ATTENTION OF:

September 21, 1996

Regulatory Branch
File No. 199610990

Chemetco
Post Office Box 67
Hartford, Illinois 62048

Gentlemen:

We have reviewed your facsimile of September 20, 1996, requesting emergency authorization to conduct remedial actions for a recent Zinc Oxide spill affecting Long Lake. The clean-up efforts would involve constructing an earthen levee, averaging 2 to 5 feet high and 10 feet wide, around the perimeter of the affected area. A five-foot-high levee with a poly liner and rock cap would be constructed within the perimeter of the earthen levee, directly adjacent to the affected portion of Long Lake, to serve as a containment area. The dammed portion of Long Lake would be dewatered and excavated to remove the presence of Zinc Oxide. This material would be pumped over the adjacent lined and rock capped levee for further remedial action. An unnamed tributary to Long Lake, flowing into the affected area, would have to be diverted around the earthen levee for an approximate 700-foot-long reach to maintain flows. In addition, an approximate 450-foot-long by 25-foot-wide by 4-foot-deep channel would be excavated to keep Long Lake connected below the dammed off portion. The subject activity site is located approximately 4 miles directly south of Hartford, near Oldenburg, in Madison County, Illinois.

We have determined that the proposed project is authorized under Section 404 of the Clean Water Act by existing Department of the Army nationwide permits as described in 33 CFR 330, Appendix A (B)(38). Enclosed is a copy of the nationwide permit, and terms and conditions (marked in red) with which you must comply.

The Illinois Environmental Protection Agency has denied water quality certification for these permits. You must obtain individual water quality certification or generic 401 certification or provide to the Corps a copy of the application to the state for the certification. If the IEPA fails to act within a reasonable period of time (60 days from the date of this letter), a waiver will be presumed. Upon receipt of water quality certification, the proposed work is authorized. If the water quality certification is conditioned by the state, these conditions will become part of the Corps permits. The District Engineer has conditioned this permit to include the following:

a. Any excess material associated with the activities of this project will not be discharged into either aquatic areas or wetland areas.

b. All excess material will be removed to upland sites and not stored or abandoned within the floodplain area.

c. The applicant shall ensure that the project not cause: (1) violation of applicable water quality standards of the Illinois Pollution Control Board, Title 35, Subtitle C: Water Pollution Rules and Regulations; (2) water pollution as defined and prohibited by the Illinois Environmental Protection Act; and (3) interference with water use practices near public recreation areas or water supply intakes.

d. All areas affected by construction shall be mulched and seeded as soon after construction as possible. The applicant shall undertake necessary measures and procedures to reduce erosion during construction. Interim measures to prevent erosion during construction shall be taken and may include the installation of staked straw bales, sedimentation basins and temporary mulching.

e. All impacted areas including, but not limited to, Long Lake, the unnamed tributary, and wetland sites will be returned to their pre-spill and pre-project conditions upon completion of the remedial actions. A restoration plan must be submitted to this office within six months from the date of this letter and all restoration activities must be completed within one year from the date of this letter.

This determination is applicable only to the permit program administered by the Corps of Engineers. It does not eliminate the need to obtain other Federal, state, or local approvals before beginning work.

You are reminded that the permit is based on submitted plans. Variations from these plans shall constitute a violation of Federal law and may result in the revocation of the permit. This verification will be valid until the nationwide permit is modified, reissued, or revoked prior to January 21, 1997. It is incumbent upon you to remain informed of changes to the nationwide permits. We will issue a public notice announcing the changes when they occur. Furthermore, if you commence, or are under contract to commence, this activity before the date the nationwide permit is modified or revoked you will complete the activity under the present terms and conditions of the nationwide permit.

If the proposed project does not satisfy all conditions as indicated, please contact Charles Frerker at (314) 331-8583 for advice or information you may need in preparing an application for an individual permit.

Sincerely,

Michael Ricketts
Corps/Rivers Project Manager

Enclosure

Copy Furnished: (w/o enclosure)

Mr. Bruce Yurdin
Illinois Environmental Protection Agency
DWPC, Permit Section, Watershed Unit
2200 Churchill Road
Springfield, Illinois 62794-9276

Mr. Robert Dalton
Illinois Department of Natural Resources
Office of Water Resources
3215 Executive Park Drive
Post Office Box 19484
Springfield, Illinois 62794-9484

Ms. Joyce Collins
U.S. Department of the Interior
Fish and Wildlife Service (ES)
Rural Route 3 , Box 328
Marion, Illinois 62959-9579

Mr. Gerald D. Winn
U.S. Environmental Protection Agency
Region V
Wetland Protection Section (5WQW-16J)
77 West Jackson Boulevard
Chicago, Illinois 60604

Ms. Anne Haaker
State Historic Preservation Office
Illinois Historic Preservation Agency
State Capitol
Springfield, Illinois 62701

Mr. Robert Schanzle
Illinois Department of Natural Resources
524 South Second Street
Springfield, Illinois 62701-1787

CSD Environmental Services, Inc.

CHEMETCO, INC.
SAMPLING AND ANALYSIS PLAN
FOR ZINC OXIDE SPILL AREA

Prepared by:

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

October 10, 1996

TABLE OF CONTENTS

CHEMETCO, INC.
SOIL SAMPLING AND ANALYSIS PLAN
FOR ZINC OXIDE SPILL AREA

1.0 INTRODUCTION

Chemetco, Inc. (Chemetco) is a secondary copper smelter located at the intersection of Route 3 and Oldenberg Road in Hartford, IL. Chemetco was constructed in 1969 and began producing anode copper, cathode copper, crude lead-tin solder, zinc oxide and slag in 1970. The facility is located in an agricultural, light residential area south of Hartford, IL, about one mile east of the confluence of the Missouri and the Mississippi Rivers. On September 17, 1996 during a routine RCRA Inspection, the Illinois Environmental Protection Agency (IEPA) and Chemetco discovered a spill of zinc oxide material from an abandoned pipe south of Oldenberg Road. The spill was found to have entered Long Lake at the southern portion of the plant property. The spill was contained on Chemetco's property. This Sampling and Analysis Plan was compiled to determine the appropriate sampling parameters, locations and clean up objectives of the spilled zinc oxide material. A map indicating the location of the spilled zinc oxide is provided as Figure 1.

2.0 SAMPLING AND ANALYSIS

2.1 Objectives

This Sampling and Analysis Plan (SAP) describes the activities associated with determining location of, and collection method for, samples to determine the levels of lead, cadmium and zinc which are proposed to remain in the soil.

2.2 Sampling Team Responsibilities

Responsibilities of the sampling team are described below:

2.2.1 Sampling Team Leader

The sampling team leader (STL) will be responsible for conducting the sampling program, assuring the availability and maintenance of all sampling equipment and materials, and providing for shipping and packing materials. The STL will supervise and be responsible for the completion of all chain-of-custody records, proper handling and shipping of the samples collected, and the accurate completion of field log books. The STL will be present on-site whenever samples are collected.

2.2.2 Sampling Team Member(s)

The sampling team member(s) (STM) will collect samples, transfer them for shipping, and decontaminate sampling equipment as directed by the STL.

2.3 Sampling Summary

Soil samples will be collected from a grid interval and the sampling depths described in Section 3.2.

Soil samples will be analyzed using USEPA SW-846 method 9045 for pH, TCLP method 6010A for lead, cadmium and zinc. These analytical parameters were selected based on knowledge of the types of waste streams stored in these areas. The data will be evaluated in accordance with Section 5.0 of this plan.

3.0 SITE CHARACTERIZATION AND SAMPLING PROCEDURES

The following subsections present the procedures to be followed for site activities related to field surveys and sampling efforts.

3.1 Site Preparation for Soil Sampling

Prior to collecting soil samples from Long Lake, the visible zinc oxide will be removed by a trackhoe and placed into a containment area labeled area #1 for temporary storage. Refer to Figure 2 for the location of the containment areas.

Prior to collecting soil samples from containment area #1, the visible zinc oxide will be removed and sold to Chemetco's existing zinc oxide customers.

Prior to collecting soil samples from containment area #2, the water temporarily stored within will be sampled. If sample results are below the current NPDES limits, the water will be discharged under the current NPDES permit. If the results are above current NPDES limits, the water will be transported to the plant and used as cooling tower make up water.

3.2 Soil Sampling Procedures

The location of the soil sampling points are to be based upon the following equation:

$$GI = (A/\Pi)^{0.5}/2$$

where: A = area to be gridded in feet^2 , and GI = grid interval (feet)

Using the entire spill area a grid interval of 130' was derived. However, this interval resulted in only four sample locations within Long Lake. The grid interval was recalculated removing the area of Long Lake (referred to as CA-3 in the calculations) from the total area. The calculated area for containment areas 1,2, and 4 equals 161,000 feet^2, resulting in a grid interval of 113'. The area of Long Lake (containment area #3) equals 50,000 feet^2, resulting in a grid interval of 63'.

Samples will be collected where the grid lines cross. Figure 3 is a map of the approximate sample locations. The soil samples will be collected using a hand auger. Samples will be collected at two intervals, 0-6 inches and 18 - 24 inches in depth.

The soil will be sampled using the following procedures:

1. A decontaminated hand auger will be turned to the appropriate depth to obtain a representative sample;

2. The sample will be removed from the auger in the field and placed in a laboratory provided glass jar for shipping;

3. The sample jar will be immediately placed into a cooler chilled to 4 degrees Celsius; and

4. The samples will be transported to the laboratory within 24 hours of sample collection.

The hand auger will be decontaminated in accordance with the procedures discussed in Section 3.8. The any other equipment used will be decontaminated prior to and upon completion of sampling in accordance with the procedures in Section 3.8.

3.3 Analytical Program

All soil samples sent for chemical analysis will be analyzed for the group of parameters specified in Section 2.3 by Prairie Analytical Systems, Inc. located in Springfield, IL.

3.4 Sampling Methodologies

Before beginning to auger the site, the STL will become acquainted with the site features and the planned boring locations. Any movable structures will be cleared away from each location, if necessary. Equipment will be decontaminated prior to each new soil boring, following procedures included in Section 3.8.

3.5 Documentation

Sample collection will take place in the presence of a geologist. The geologist will log all borings and, at a minimum, will note the following:

- sample identification;
- date(s);
- sampling equipment used;
- sample depths;
- sample recovery;
- sample description; and
- remarks.

3.6 Sample Numbering System and Labeling

A sample numbering system will be used to allow tracking, retrieval, cross referencing of sample information and positive identification. Each sample submitted for chemical analysis will be assigned a unique sample identification number. The samples will be numbered as identified below.

1. For samples collected from containment area #1 the following number system shall be used:

   CA-1 1 - 6"
   CA-1 1 - 18"

CA-1 will identify the sample as being derived from containment area #1, with the numerical designation identifying the sample order and the depth at which the sample was collected will be provided.

2. For samples collected from containment area #2 the following number system shall be used:

CA-2 1 - 6"
CA-2 1 - 18"

CA-2 will identify the sample as being derived from containment area #2, with the numerical designation identifying the sample order and the depth at which the sample was collected will be provided.

3. For samples collected from Long Lake - Containment Area #3, the following number system shall be used:

CA-3 1 - 6"
CA-3 1 - 18"

CA-3 will identify the sample as being derived from Long Lake, with the numerical designation identifying the sample order and finally the depth at which the sample was collected will be provided.

4. For samples collected from containment area #4 the following number system shall be used:

CA-4 1 - 6"
CA-4 1 - 18"

CA-4 will identify the sample as being derived from containment area #4, with the numerical designation identifying the sample order and the depth at which the sample was collected will be provided.

3.6.1 Labeling

Sample labels will be affixed to each sample at the time of collection. The label will include the following information as a minimum:

- Sample identification number;
- Date sampled;
- Time sampled; and
- Person sampling.

In addition, each person involved in the sampling activity will record the above information, as well as comments regarding sampling, in a field log book and on the chain of custody form.

3.7 Sample Shipment

Each sample will be placed into individual laboratory provided glass jars. Samples will be placed carefully in coolers for storage and shipment. At least two bags of ice, sealed in double plastic bags will be placed inside to maintain samples at approximately 4 degrees C. Each cooler will be provided with a chain-of-custody form. Attachment 1 illustrates a typical chain-of-custody form.

All environmental samples for analytical testing will be hand delivered or shipped overnight to Prairie Analytical within 24 hours after sampling to allow completion of analyses within the specified holding times.

3.8 Decontamination Procedures

In order to minimize the potential for cross-contamination between borings, samples and equipment which may come in contact with the sample media will be decontaminated before sampling. In addition, all equipment will be decontaminated between samples. All rinse waters used for decontamination will be captured and containerized into 55 gallon drums. The rinse waters will be transported to the polish pits or containment area #2 for disposal.

Reusable non-dedicated equipment (hand auger, split spoons, scoops, etc.) will be decontaminated between each sample and before removal from the site. The decontamination procedures for all sampling equipment will be as follows:

1. Soap wash (Alconox or equivalent) in hot water solution;
2. Potable water rinse;
3. Potable water rinse; and
4. Air Dry.

The equipment used to assist in the collection of samples will be decontaminated prior to and immediately after completion of the project. The equipment will be decontaminated using a high pressure hot water wash. A decontamination pad will be constructed of plastic sheeting and lumber. All rinse waters will be collected in a 55 gallon drum and transferred into a temporary tank by a portable pump. The rinse water will be transferred to the polish pits or containment area #2 for disposal.

3.9 Miscellaneous

3.9.1 Quality Assurance/Quality Control

Quality Assurance/Quality Control samples will include a field blank. The field equipment rinse blank sample will be collected by pouring laboratory-provided distilled/deionized water over a decontaminated split spoon or hand auger. The field blank will be analyzed for lead, cadmium and zinc.

3.9.2 Air Emissions

Chemetco will minimize air emissions during the excavation of the spilled zinc oxide by keeping the zinc oxide wet. Chemetco's water truck will spray the zinc oxide material on a daily basis to ensure dust problems do not occur.

3.9.3 Personnel Safety and Fire Prevention

Clean up operations are being conducted by personnel who have received 40 hours of health and safety training in compliance with OSHA, 29 CFR 1910.120(E). All managers and supervisors present have received an additional eight hours of specialized training on managing hazardous waste operations.

4.0 SITE INVESTIGATION REPORT

Following receipt of final analytical results, a report will be prepared summarizing the methods and results of the investigation. The report will contain information as outlined below:

- An area map will be prepared showing the general site location.
- Field and laboratory methods will be outlined and laboratory analytical results

will be reported.

- The nature and extent of any subsurface contaminants detected during the investigation will be summarized.

5.0 CLEAN UP OBJECTIVES

The data will be evaluated to determine if lead, cadmium and zinc values are above the Class II, Migration to Groundwater Values presented in TABLE A: Tier 1 Soil Remediation Objectives for Residential Properties as proposed in Title 35: Environmental Protection; Subtitle G: Waste Disposal; Chapter I: Pollution Control Board; Subchapter f: Risk Based Cleanup Objectives; Part 742 - Tiered Approach to Corrective Action Objectives. Class II numbers were chosen since the groundwater beneath the spill area is not located 10 feet or more below the ground surface as required for a Class I aquifer under 35 Ill. Adm. Code, Part 620, Section 620.210. Depth to groundwater beneath the spill area ranges from 3 to 7 feet. TABLE 1; Tier 1 Remediation Objectives are presented below:

		Route-Specific Values for Surface Soils		Migration to Groundwater Route Values		
CAS #	Chemical Name	Ingestion	Inhalation	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
7440-43-9	Cadmium[l,n]	78[b,r]	1800[e]	0.005[m]	0.05[m]	*
7439-92-1	Lead	400[b]	----[c]	0.0075[m]	0.1[m]	*
7440-66-6	Zinc	23,000[b]	----[c]	5.0[o]	10.0[o]	*

* Indicates ADL is less than or equal to the specified cleanup objective.

c No toxicity criteria available for the route of exposure.

k A preliminary remediation goal of 400 mg/kg has been set for lead based upon Revised Interim Soil Lead Guidance for CERLCA Sites and RCRA Corrective Action Facilities, OSWER Directive #9355.4-12.

l Potential for soil-plant-human exposure.

m Concentration in mg/L determined by the Toxicity Characteristic Leaching Procedure (TCLP). The person conducting the remediation has the option to use TCLP objectives listed in this Table or the applicable pH-specific soil cleanup objectives listed in Appendix, Table C or D. If the person conducting the remediation wishes to calculate soil cleanup objectives based on background concentrations, this should be done in accordance with Subpart C of 742.

n The agency reserves the right to evaluate the potential for remaining contaminant concentrations to pose significant threats to crops, livestock, or wildlife.

o For agrichemical facilities, cleanup objectives for surficial soils which are based on field application rates may be more appropriate for currently registered pesticides. Consult the Agency for further information.

If TCLP lead, cadmium and zinc values are above the Class II objectives, Chemetco retains the right to further evaluate clean up objectives using a Tier 2 or 3 evaluation, further treatment or a combination of both.

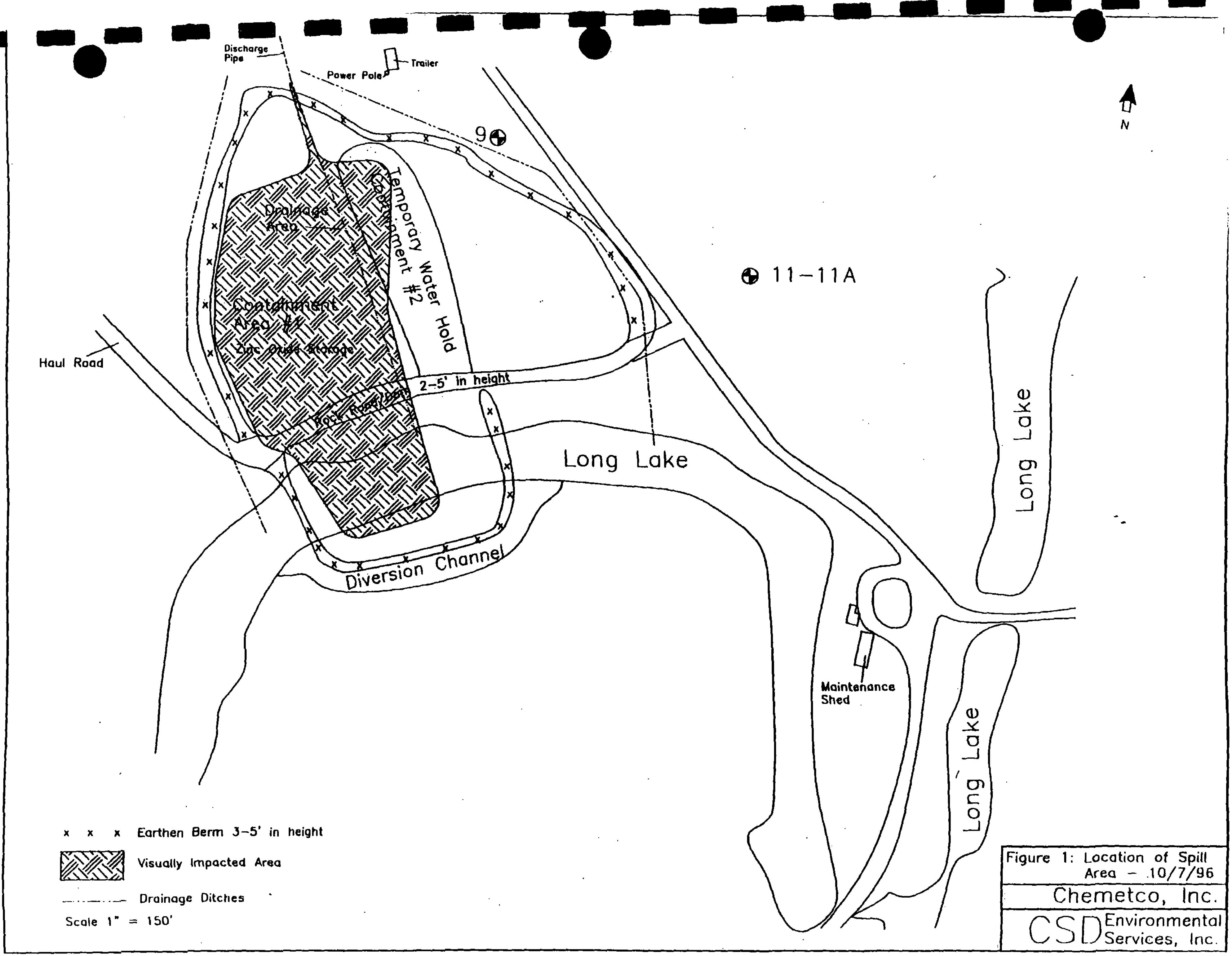


Figure 1: Location of Spill Area – 10/7/96

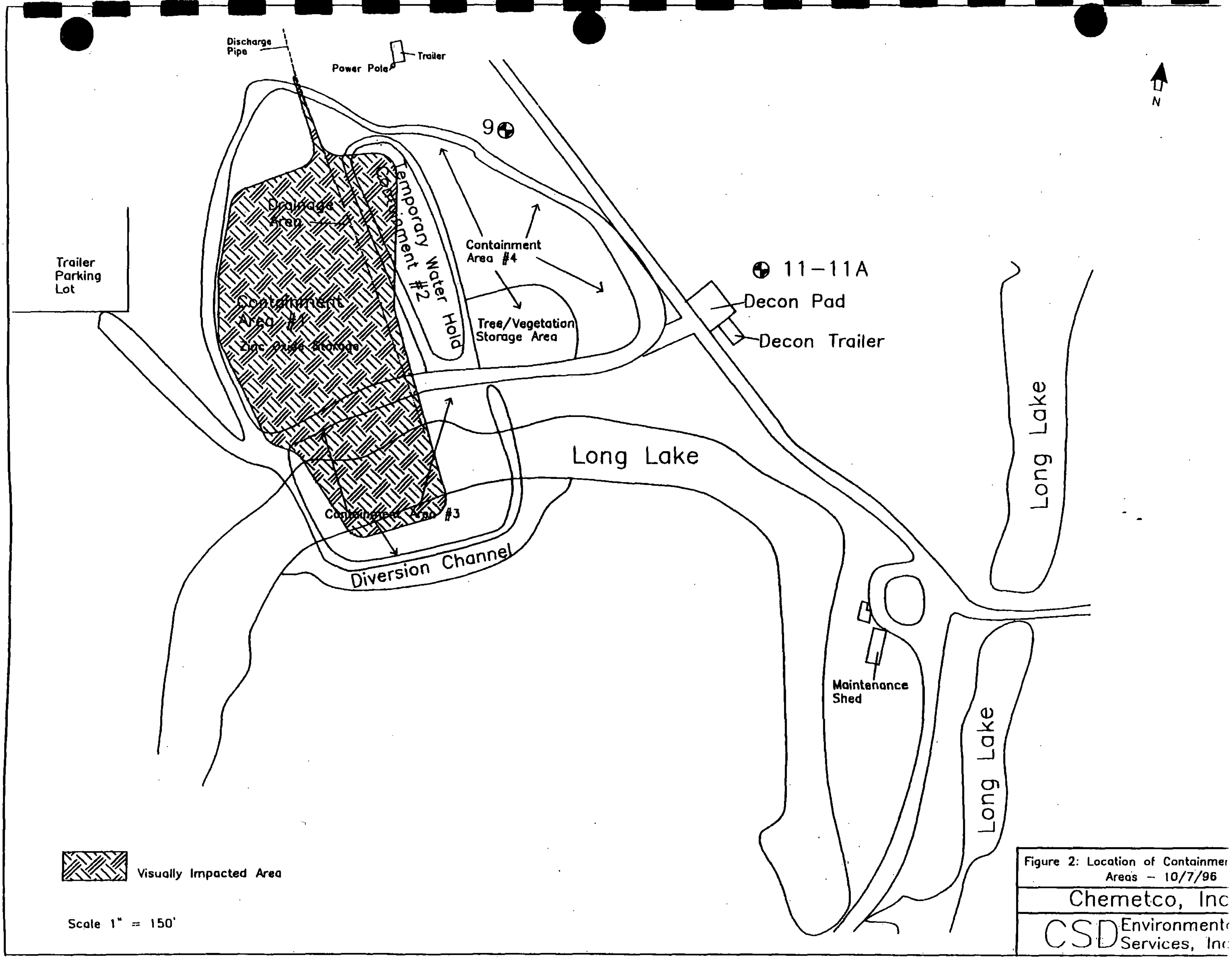
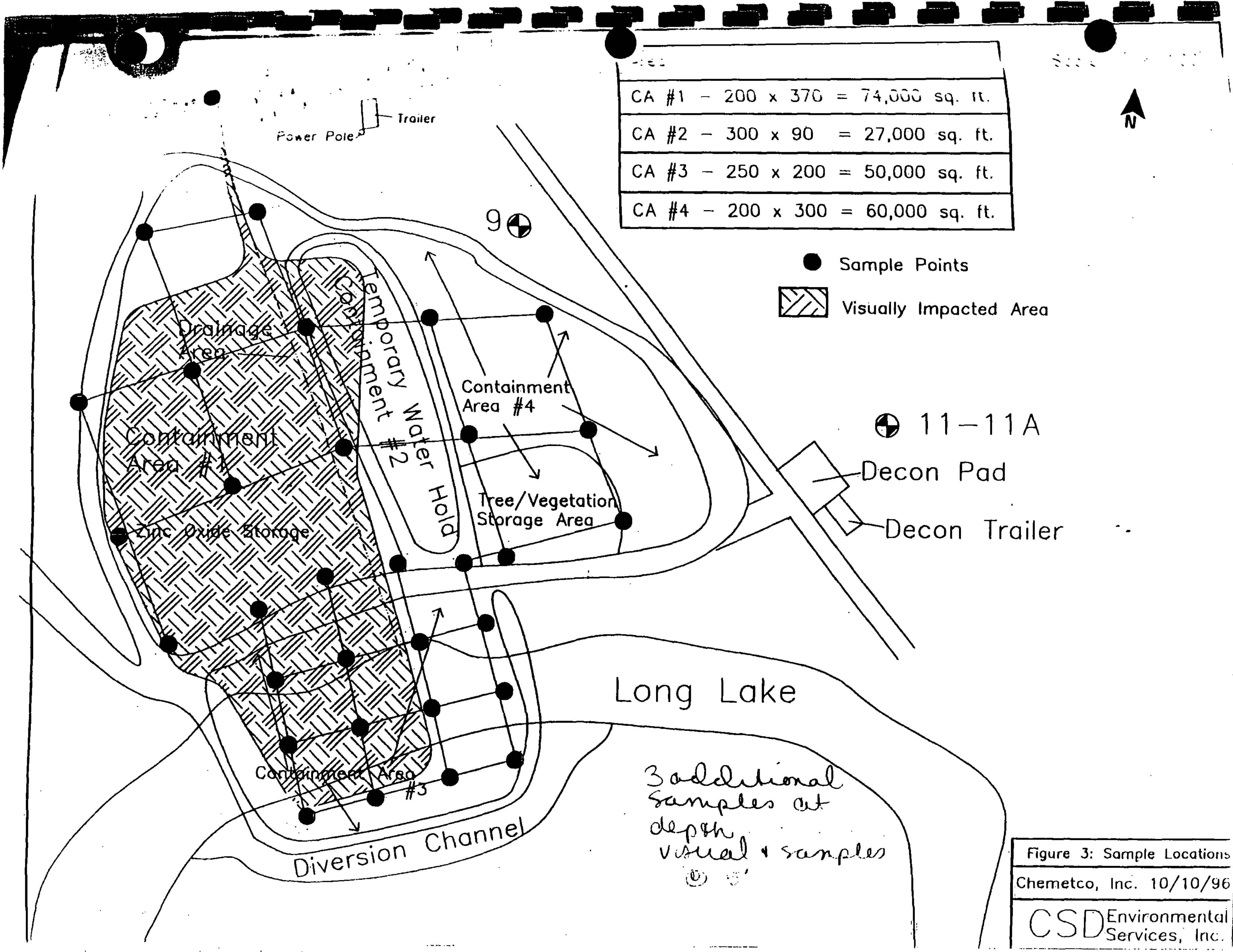


Figure 2: Location of Containmer Areas – 10/7/96

Chemetco, Inc

CSD Environment Services, Inc



CA #1	–	200	x	370	=	74,000	sq. ft.
CA #2	–	300	x	90	=	27,000	sq. ft.
CA #3	–	250	x	200	=	50,000	sq. ft.
CA #4	–	200	x	300	=	60,000	sq. ft.

Figure 3: Sample Locations

Chemetco, Inc. 10/10/96

CSD Environmental Services, Inc.

Chain of Custody Record

Page ___ ___

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client		Project	
Address		Contact Person	
City, State, Zip		P. O. #/ Invoice to:	
Phone Number		Facsimile Number	

Sample Description (15 Characters ONLY)	Sample Matrix	Sampling		Container		Preser-vative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			

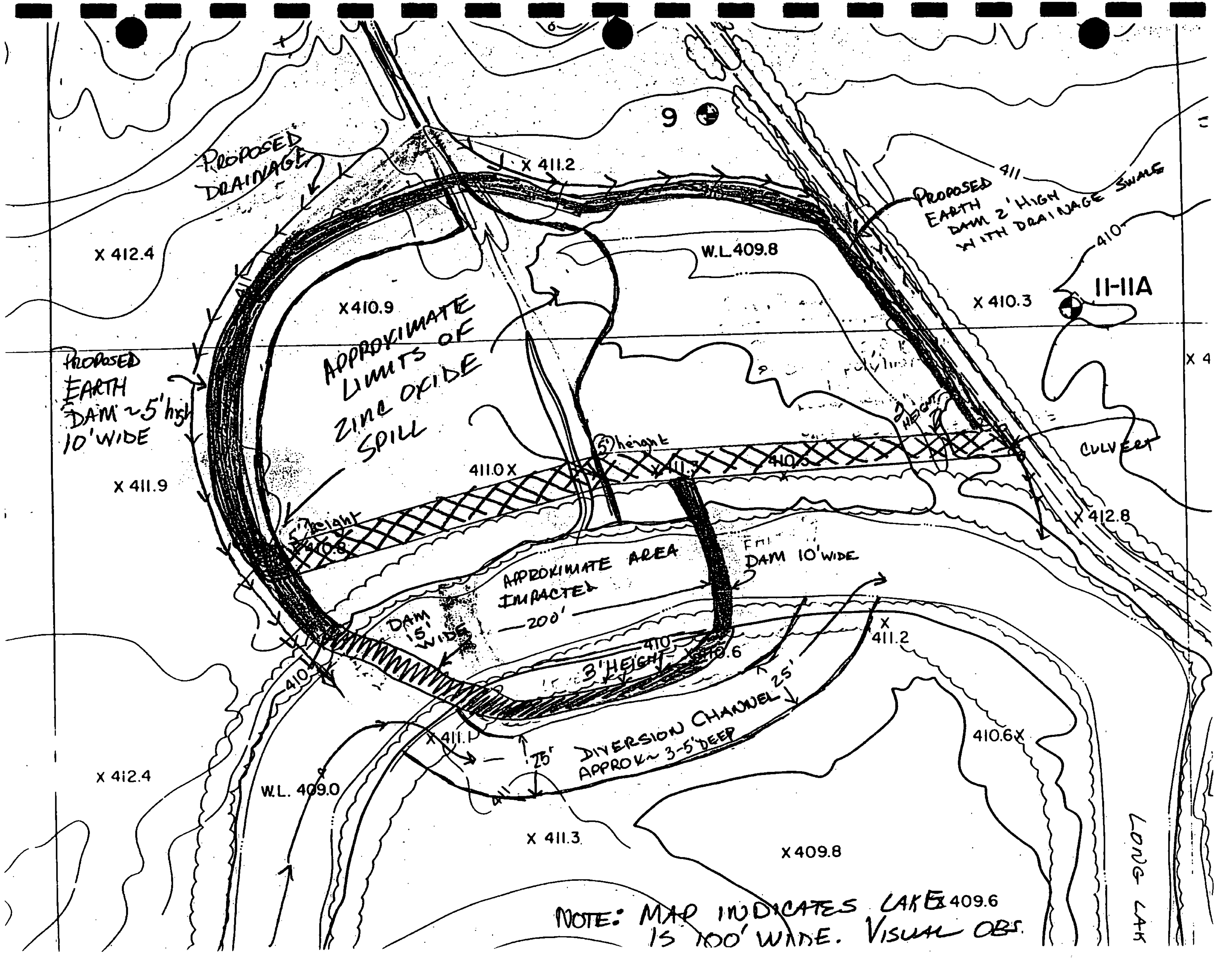
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: ____________

Form PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Sampler



9
PROPOSED DRAINAGE
X 411.2
411
PROPOSED EARTH DAM 2' HIGH WITH DRAINAGE SWALE
410
X 412.4
W.L. 409.8
11-11A
X 410.3
X 410.9
APPROXIMATE LIMITS OF ZINC OXIDE SPILL
PROPOSED EARTH DAM ~5' high 10' WIDE
5' height
411.0 X
CULVERT
X 411.9
X 412.8
DAM 10' WIDE
APPROXIMATE AREA IMPACTED
200'
DAM 15' WIDE
X 411.2
410
3' HEIGHT
X 410.6
25'
410
DIVERSION CHANNEL APPROX ~ 3-5' DEEP
X 411.1
25'
410.6 X
X 412.4
W.L. 409.0
X 411.3
X 409.8
LONG LAK
NOTE: MAP INDICATES LAKE IS 100' WIDE. VISUAL OBS
X 409.6

7/20/90
CSD

Chemetco –
Construction Plans

1. Construct Road with 3" minus at a 2 foot height Beginning from West side of Private Lane. Grade increases to 5' height at location of drainage ditch. Height of 5' is maintained ~~for~~ approx 300' where intercepts earthen dam.

2. Line N side of Road with 2-10 mil poly liner as a barrier to hold water. CA-6 to cover poly liner

3. Create an earthen dam 5' high on West side of spilled area. Create drainage swale to divert surface (rain) water to Long Lake around the impacted area.

4. Construct a diversion channel 25' feet wide × 3-5 feet deep.

5. Construct 2 dams on Long Lake. East dam approx 10-12' wide. West dam 15' wide

6. Construction order
   1) Build Rock dam/road
   2) Excavate Div. channel & build dam ~3' high on N side of channel.
   3) Construct 15' wide dam on west side
   4) Construct 12' wide dam on East side
   5) Finish last portion of Div. channel

7/24/70
CSD

TO RELEASE WATER.

7. TO REMOVE SPILLED MATERIAL FROM LAKE ONCE DAMMED:

A. TEMPORARY EARTH PLATFORM WILL BE CONSTRUCTION TO ALLOW TRACKHOE ACCESS TO EXCAVATE. EXCAVATED MATERIAL TO BE DEPOSITED ON NORTH SIDE OF ROCK DAM/ROAD.

B. SOIL + WATER SAMPLES WILL BE COLLECTED TO DETERMINE when cleanup is finished. Clean up #'s to be g determined by IEPA.

TREES - DEAD Present in ~~??~~ AFFECTED PORTION OF LAKE WILL BE REMOVED.

ATTACHMENT 3

Initial Excavation Sample Results

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 09 October 1996
Date Received: 10 October 1996
Date Analyzed: 11 October 1996
Date Reported: 11 October 1996

Project: Chemetco

PAS Project Code: CSD-122

Sample Description:	Long Lake 1	Long Lake 2	Long Lake 3
Sample Number:	9610104222	9610104223	9610104224

Total Metals Analysis

Parameters	Detection Limit mg/kg	Result mg/kg	Result mg/kg	Result mg/kg	E.P.A. Method
Cadmium	0.004	56.3	8.3	16.1	6010A
Lead	0.001	27.1	75.5	333	7421
Zinc	0.002	519	498	716	6010A

TCLP Metals Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.004	<0.004	<0.004	1.3	6010A
Lead	0.042	<0.042	<0.042	10.4	6010A
Zinc	0.002	4.5	4.9	77.1	6010A

Stephen R. Johnson, Laboratory Director

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Form PAS-RWMET3

Chain of Custody Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD ENVIRONMENTAL INC	Project	CHEMETCO
Address	2220 YALE	Contact Person	M. SIMMERING/CINDY DAVIS
City, State, Zip	SPFLD IL 62703	P. O. #/ Invoice to:	CSD ENV. INC.
Phone Number	522-4085	Facsimile Number	522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling Date	Sampling Time	Container Size	Container No.	Preser-vative	Analysis Requested	PAS Sample Number
LONG LAKE 1	Soil	10/9	A.M.	4 oz	1	–	TOTAL + TCLP LEAD, CADMIUM, ZINC	4222
LONG LAKE 2	|	|	|	|	|	|	| | | | |	4223
LONG LAKE 3								4224
							NOTE: NEED QUICK TURN AROUND AND FAX RESULTS TO (618) 254-0138 ATT/ MARC S. + GREG COTTER THANK YOU	

Relinquished by: Marc Simmering		Received by: Sarah A Fulton	
Date: 10/9/96	Time: 3:05 P.M.	Date: 10/10/96	Time: 10:00 am
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS: Friday

PAS Project CODE: CSD-122

Form PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Smapler

ATTACHMENT 4

Sampling and Analysis Plan - Zinc Oxide Spill

ATTACHMENT 5

Photographs

Spill Area Prior to Containment looking South

Looking Northwest

Long Lake Prior to Removal

Spill Area Prior to Containment looking North

Long Lake Prior to Removal

Containment Area #1 prior to water removal

Vegetation Stockpile

Diversion Channel along Long Lake

Construction of decontamination pad

Construction of east berm (Containment Area #4)

Excavating hole for insertion of 55 gallon drum for water removal

Excavating hole for insertion of 55 gallon drum for water removal

Decontamination pad and job trailer

Emptying of load of water from Long Lake

Construction of rock road/dam

Removal of water from Long Lake

Zinc oxide and temporary construction pads in Long Lake facing south

Containment Area #1 looking southeast to northwest

Removal of trees from Long Lake

Spill Area looking east to west

Zinc Oxide

Zinc oxide spill area looking west to east

Pushing zinc oxide from east edge of the spill towards Containment Area #1 to construct Containment Area #2

Pushing zinc oxide from east edge of the spill towards Containment Area #1

Containment Area #2

Delivery of shredder

Shredding of trees

Inside shredder

Soil Removed from Containment Area #3

Removal of zinc oxide in ditch between Containment Areas 1 and 2

Removal of zinc oxide in ditch between Containment Areas 1 and 2

Construction of Containment Area #2

Construction of Containment Area #2

Containment Area #2 looking to the north towards the plant

Zinc Oxide - Containment Area #1 looking to north towards plant

Removal of zinc oxide from Long Lake

Zinc oxide in Long Lake after trees were removed. Looking to the north towards the plant.

Containment Area #1

Removal of Rock Pads in Containment Area #3

Final Soil Removal in Containment Area #3

Final Soil Removal in Containment Area #3

Zinc Oxide

Decontamination

Decontamination of equipment used to remove trees

Decontamination of dozer

Decontamination of bulldozer

Long Lake looking to the west

ATTACHMENT 6

Analytical Results from Containment Areas 3 and 4

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 24 October 1996
Date Received: 25 October 1996
Date Analyzed: 31 October 1996
Date Reported: 01 November 1996

Project: Chemetco

PAS Project Code: CSD-126

Sample Description:	CA3-1-6	CA3-1-18	CA3-2-6
PAS Sample No.:	9610254568	9610254569	9610254570

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.013	<0.001	<0.001	7131A
Lead	0.001	0.012	<0.001	<0.001	7421
Zinc	0.002	<0.002	<0.002	<0.002	6010A

Sample Description:	CA3-2-18	CA3-3-6	CA3-3-18
PAS Sample No.:	9610254571	9610254572	9610254573

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	<0.001	0.005	0.007	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	<0.002	<0.002	<0.002	6010A

Stephen R. Johnson

Stephen R. Johnson, Laboratory Director

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Form PAS-TCLPM

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Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.	Date Sampled: 24 October 1996
2220 Yale Boulevard	Date Received: 25 October 1996
Springfield, IL 62703	Date Analyzed: 31 October 1996
	Date Reported: 01 November 1996

Project: Chemetco

PAS Project Code: CSD-126

Sample Description:	CA3-4-6	CA3-4-18	CA3-5-6
PAS Sample No.:	9610254574	9610254575	9610254576

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.007	0.005	0.010	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	<0.002	<0.002	<0.002	6010A

Sample Description:	CA3-5-18	CA3-6-6	CA3-6-18
PAS Sample No.:	9610254577	9610254578	9610254579

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.006	0.066	0.061	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	<0.002	0.04	<0.002	6010A

Stephen R. Johnson

Stephen R. Johnson, Laboratory Director

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 24 October 1996
Date Received: 25 October 1996
Date Analyzed: 31 October 1996
Date Reported: 01 November 1996

Project: Chemetco

PAS Project Code: CSD-126

Sample Description:	CA3-7-6	CA3-7-18	CA3-8-6
PAS Sample No.:	9610254580	9610254581	9610254582

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.48	0.009	0.010	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	8.1	0.21	<0.002	6010A

Sample Description:	CA3-8-18	CA3-9-6	CA3-9-18
PAS Sample No.:	9610254583	9610254584	9610254585

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.010	0.029	0.047	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	0.24	0.70	<0.002	6010A

Stephen R. Johnson

Stephen R. Johnson, Laboratory Director

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Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 24 October 1996
Date Received: 25 October 1996
Date Analyzed: 31 October 1996
Date Reported: 01 November 1996

Project: Chemetco

PAS Project Code: CSD-126

Sample Description:	CA3-3-5	CA3-4-5	CA3-4-26
PAS Sample No.:	9610254586	9610254587	9610254588

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.020	0.007	0.008	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	<0.002	<0.002	<0.002	6010A

Sample Description:	CA3-7-5	---	---
PAS Sample No.:	9610254589	---	---

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.106	---	---	7131A
Lead	0.001	<0.001	---	---	7421
Zinc	0.002	1.32	---	---	6010A

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Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 23 October 1996
Date Received: 25 October 1996
Date Analyzed: 31 October 1996
Date Reported: 01 November 1996

Project: Chemetco

PAS Project Code: CSD-126

Sample Description:	CA4-1(6")	CA4-1(18")	CA4-2(6")
PAS Sample No.:	9610254590	9610254591	9610254592

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.018	<0.001	0.048	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	<0.002	<0.002	0.53	6010A

Sample Description:	CA4-2(18")	CA4-3(6")	CA4-3(18")
PAS Sample No.:	9610254593	9610254594	9610254595

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.014	<0.001	0.005	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	<0.002	<0.002	0.16	6010A

Stephen R. Johnson

Stephen R. Johnson, Laboratory Director

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 23 October 1996
Date Received: 25 October 1996
Date Analyzed: 31 October 1996
Date Reported: 01 November 1996

Project: Chemetco

PAS Project Code: CSD-126

Sample Description:	CA4-4(6")	CA4-4(18")	CA4-5(6")
PAS Sample No.:	9610254596	9610254597	9610254598

. TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.053	0.107	<0.001	7131A
Lead	0.001	0.472	0.047	<0.001	7421
Zinc	0.002	11.7	3.97	<0.002	6010A

Sample Description:	CA4-5(18")	CA4-9(6")	CA4-9(18")
PAS Sample No.:	9610254599	9610254600	9610254601

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.032	0.014	<0.001	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	<0.002	<0.002	<0.002	6010A

Stephen R. Johnson

Stephen R. Johnson, Laboratory Director

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Form PAS-RWMETAL

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Chain of Cu dy Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD Environmental	Project	Chemetco
Address	2220 Yale	Contact Person	CSD
City, State, Zip	Springfield Il	P. O. #/ Invoice to:	CSD
Phone Number	217-522-4085	Facsimile Number	

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling Date	Sampling Time	Container Size	Container No.	Preser-vative	Analysis Requested	PAS Sample Number
CA3-7-6	Soil	10/24	AM	4oz		None	TCLP ~~Pb~~ Cd, Pb + Zinc	4580
CA3-7-18	↓	↓		↓		↓	Detection limit of	4581
CA3-8-6							0.0075 mg/L needed	4582
CA3-8-18							for lead.	4583
CA3-9-6								4584
CA3-9-18								4585
CA3-~~3~~-5'								4586
CA3-4-5								4587
CA3-4-~~24~~ 26								4588
CA3-7-5								4589

per C.D. 10/25/96 9:50 am

Relinquished by: Marc Simmins		Received by: Sarah A Fulton	
Date: 10/25/96	Time: 9:25	Date: 10/25/96	Time: 9:25am
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-126

Form PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Smapler

Chain of Cu dy Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD Environmental	Project	Chemetco
Address	2220 Yale Boulevard	Contact Person	C. DAVIS
City, State, Zip	Springfield, IL 62703	P. O. #/ Invoice to:	CSD
Phone Number	217/522-4085	Facsimile Number	217/522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling Date	Sampling Time	Container Size	Container No.	Preservative	Analysis Requested	PAS Sample Number
CA3-1-6	Soil	10/24	AM	4oz		NONE	TCLP LEAD, CAD, + ZINC.	4568
CA3-1-18							Need detection limit on	4569
CA3-2-6							lead of 0.0075 mg/l	4570
CA3-2-18								4571
CA3-3-6								4572
CA3-3-18								4573
CA3-4-6								4574
CA3-4-18								4575
CA3-5-6								4576
CA3-5-18								4577
CA3-6-6								4578
CA3-6-18								4579

Relinquished by: Man Sunning		Received by: Sarah A. Fulty	
Date: 10/25/96	Time: 9:25	Date: 10/25/96	Time: 9:25am
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-126

Form:PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Smapler

Chain of Cu[illegible]dy Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD Environmental Inc	Project	CHEMETCO
Address	2220 Yale	Contact Person	M. Simmering / Cindy Davis
City, State, Zip	SPFID Il 62703	P. O. #/ Invoice to:	CSD Env. Inc.
Phone Number	522-4085	Facsimile Number	522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling Date	Sampling Time	Container Size	Container No.	Preservative	Analysis Requested	PAS Sample Number
CAY-1 (6")	Soil	10/23	P.M.	4oz.	1	None	TCLP Lead, Cad & Zinc.	4590
CAY-1 (18")	↓	↓	↓	↓	↓	↓	Need Detection limit of	4591
CAY-2 (6")	↓	↓	↓	↓	↓	↓	0.0075 MG/L on Lead	4592
CAY-2 (18")	↓	↓	↓	↓	↓	↓		4593
CAY-3 (6")	↓	↓	↓	↓	↓	↓		4594
CAY-3 (18")	↓	↓	↓	↓	↓	↓		4595
CAY-4 (6")	↓	↓	↓	↓	↓	↓		4596
CAY-4 (18")	↓	↓	↓	↓	↓	↓		4597
CAY-5 (6")	↓	↓	↓	↓	↓	↓		4598
CAY-5 (18")	↓	↓	↓	↓	↓	↓		4599
CAY-9 (6")	↓	↓	↓	↓	↓	↓		4600
CAY-9 (18")	↓	↓	↓	↓	↓	↓		4601

Relinquished by: Marc Simmering		Received by: Sarah A. Fultz	
Date: 10/24/96	Time: 9:30 A.M.	Date: 10/25/96	Time: 9:30 am
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-126

Form PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Smapler

ATTACHMENT 7

Variance Request to IEPA, Bureau of Water

CSD Environmental Services, Inc.

November 27, 1996

Illinois Environmental Protection Agency
Bureau of Water #19
2200 Churchill Road
P.O. Box 19276
Springfield, IL 62794-9276

Attention: Mr. Roger Callaway

RE: NPDES # IL0025747
Chemetco, Inc.
Emergency Discharge

Dear Mr. Callaway:

CSD Environmental Services, Inc. (CSD) on behalf of Chemetco Inc. (Chemetco) is seeking approval from the Illinois Environmental Protection Agency (Agency) for an Emergency Discharge of approximately 1.2 million gallons (MG) of water into Long Lake under Chemetco's existing NPDES permit. An explanation of how the water was generated is provided below.

On September 17, 1996, Chemetco discovered a stormwater discharge occurring on the south portion of their plant from a former stormwater discharge pipe which was thought to have been disconnected. Refer to Figure 1 for the location of the spill area. The stormwater discharge contained zinc oxide material and some of the discharge reached Long Lake. To remove the zinc oxide from Long Lake a permit was granted by the U.S. Army Corp of Engineers to construct two dams and a diversion channel. After the dams and diversion channel were constructed, the water contained in the affected portion of Long Lake was pumped into Containment Area #2 for holding. Figure 1 shows the location of the dams, diversions and containment areas. Containment Area #2 contains approximately 1.2 MG gallons of water. A sample was collected from the water in Containment Area #2 and analyzed for the NPDES discharge parameters specified in Chemetco's NPDES permit. Table 1 provides a summary of the sample results and a comparison to the General Use Standards as defined in 35 Ill. Adm. Code, Subtitle C, Part 304. Exceedences of the General Use Standards were found for cadmium, copper, iron, manganese, lead, suspended solids, and zinc. CSD previously verbally requested an emergency discharge permit the week of October 21. Based on these initial results you indicated, the Bureau of Water (BOW) would not grant discharge of the water without some type of treatment. In response, CSD collected an additional sample of the water and requested the laboratory to analyze for dissolved metals. Table 2 provides a summary of the sample results and a comparison to the General Use Standards. After filtering, only cadmium, manganese and suspended solids were detected above the General Use Standards.

2220 Yale Blvd., Springfield, IL 62703 · Phone 217-522-4085 · FAX 217-522-4087

It appears the majority of the constituents of concern can be removed by filtering. Chemetco proposes to treat the water by filtration prior to discharge into Long Lake. Chemetco's NPDES permit allows discharge of stormwater into Long Lake, however, no discharge standards are provided for in the permit. Chemetco is requesting an emergency discharge permit since Containment Area #2 is at capacity and we are fearful any additional rainfall will result in an unpermitted discharge. As part of the emergency permit we are requesting a temporary waiver of the Class K operator requirements. Once Containment Area #2 is emptied, no further discharge under the emergency permit is anticipated. Containment Area #2 can contain the resulting runoff from a one-time storm of approximately 19" over the spill area. Chemetco intends to apply for a major modification of their existing NPDES permit to allow additional discharges as necessary during completion of remediation. CSD will apply for a Class K license to operate the filtration unit. We are requesting permission under an emergency situation only as a bridge until the major modification of the existing permit is granted.

We are requesting the Agency's assistance in helping us find the best option for discharge of this water. This area is not serviced by sanitary or storm sewers and trucking 1.2 MG to a treatment plant does not appear to be feasible. I will be contacting you within the next 10 days to arrange a meeting between Chemetco, CSD and the Agency to discuss this issue and any options which may be available. If you have any questions before then please feel free to contact me at the number below.

Sincerely,

Cindy S. Davis
President

Table 1
Water Sample Result from Containment Area #2
Collected on October 11, 1996
Analyzed for NPDES Discharge Parameters
Total Metals

Parameter	Result in mg/l	General ~~Use~~ Discharge Standard
Silver	0.021	0.1
Boron	5.54	*
BOD	<7.5	30
Cadmium	0.563	0.15
Chlorine	<0.05	*
Copper	1.20	0.5
Iron	2.57	2.0
Hexane soluble Oil and Grease	11.5	15.0
Manganese	2.42	1.0
Nickel	0.14	1.0
Lead	1.59	0.2
Suspended Solids	67	15.0
Zinc	6.63	1.0

Those samples exceeding the General Use Standard as defined in 35 Ill. Adm. Code, Subtitle C, Part 304 are highlighted.

* No standard has been established in 35 Ill. Adm. Code, Subtitle C, Section 304.

TEST RESULTS REPORT
FOR CHEMETCO

LOG NUMBER	SAMPLE DESCRIPTION	RESULTS OF ANALYSIS	UNITS OF MEASURE
1817010	#1 South - Containment Area #2 SAMPLE DATE:10/11/96		
	Total Metals Prep/ICP	10/24/96	
	Total Metals Prep/Microwave	10/16/96	
	Silver	0.021	mg Ag/l
	Boron	5.54	mg B/l
	B.O.D. (5-day)	< 7.5	mg/l
	Cadmium	0.563	mg Cd/l
	Chlorine	< 0.05	mg Cl/l
	Copper	1.20	mg Cu/l
	Iron	2.57	mg Fe/l
	Hexane soluble Oil and Grease	11.5	mg/l
	Manganese	2.42	mg Mn/l
	Nickel	0.14	mg Ni/l
	Lead	1.59	mg Pb/l
	Suspended Solids	67	mg/l
	Zinc	6.63	mg Zn/l
1817404	Long Lake-1 SAMPLE DATE:10/17/96		
	Total Metals Prep/Microwave	10/21/96	
	Iron	29.5	mg Fe/l

Table 2
Water Sample Result from Containment Area #2
Collected on October 28, 1996
Analyzed for NPDES Discharge Parameters
Dissolved Metal Analysis

Parameter	Result in mg/l	General Use Standard
Cadmium, diss	0.22	0.15
Copper, diss	0.136	0.5
Iron, diss	<0.007	2.0
Lead, diss	0.010	0.2
Manganese, diss	2.14	1.0
Zinc, diss	0.68	1.0
Total Suspended Solids	23	15
pH	8.53	6 - 9

Those samples exceeding the General Use Standard as defined in 35 Ill. Adm. Code, Subtitle C, Part 304 are highlighted.

Chain of Cu dy Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD ENV.	Project	Chemetco
Address	2220 Yale Blvd	Contact Person	M. Simmering / Cindy
City, State, Zip	Springfield, IL 62703	P. O. #/ Invoice to:	CSD ENV.
Phone Number	217/522-4085	Facsimile Number	217/522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling		Container		Preser-vative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			
CA-2-w	water	10/28	AM	250	2	None	Cd, Fe, Pb, Zn, Cu, Manganese	
							Suspended Solids –	4647
							Dissolved	
							pH	

Relinquished by: Marc Simmering		Received by: James K. Johnson	
Date: 10/29/96	Time: 12:30	Date: 29 Oct-96	Time: 1330 hrs
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-127

Form PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Smapler

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 28 October 1996
Date Received: 29 October 1996
Date Analyzed: 01 November 1996
Date Reported: 01 November 1996

Project: Chemetco

PAS Project Code: CSD-127

Sample Description: CA-2-W

PAS Sample No.: 9610294647

Metal Analysis

Analytes	Detection Limit mg/l	Result mg/l	E.P.A. Method
Cadmium, Dissolved	0.004	0.22	6010A
Copper, Dissolved	0.001	0.136	7211
Iron, Dissolved	0.007	<0.007	6010A
Lead, Dissolved	0.001	0.010	7421
Manganese, Dissolved	0.002	2.14	6010A
Zinc, Dissolved	0.002	0.68	6010A

Miscellaneous Analysis

Analytes	Detection Limit mg/l	Result mg/l	E.P.A. Method
Total Suspended Solids	1	23	160.2
pH (units)	---	8.53	150.1

Stephen R. Johnson

Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Form PAS-RWMETAL

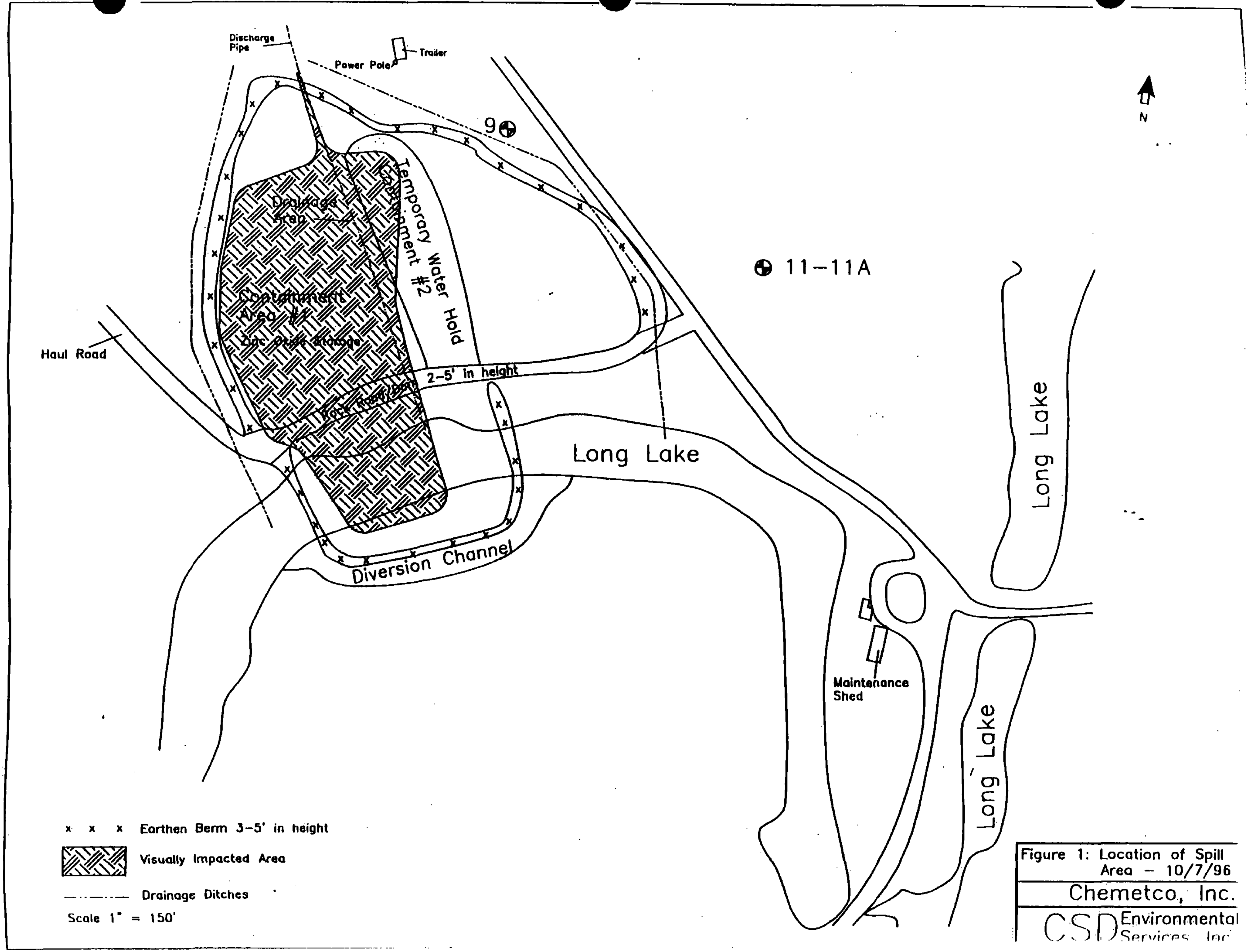


Figure 1: Location of Spill Area – 10/7/96

Chemetco, Inc.

CSD Environmental Services, Inc.

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY
2200 Churchill Road, Springfield, Illinois 62794-9276 Mary A. Gade, Director

(217) 782-9720

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

December 6, 1996

Cindy S. Davis, President
CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, Illinois 62703

Re: Provisional Variance Request-Chemetco, Inc.-NPDES Permit No. IL0025747

Dear Ms. Davis:

The Illinois Environmental Protection Agency ("Illinois EPA") has completed a preliminary review of the provisional variance request, received on December 2, 1996, that you submitted on behalf of Chemetco, Inc. Pursuant to 35 Ill. Adm. Code 180.203, the Illinois EPA hereby rejects your application for provisional variance for the reasons listed below.

No statement identifying the regulations, Illinois Pollution Control Board orders or permit requirements Chemetco is seeking a provisional variance from was provided in the request. No assessment of any adverse environmental impact the provisional variance would produce was provided in the request. No timetable for completing the proposed compliance work was provided in the request, as well as no assurance that the work would be completed within the 45 day provisional variance period. No statement was provided as to the length of time, not to exceed 45 days, for which the provisional variance is sought. Finally, no statement as to whether Chemetco has received any other provisional variances within the past calendar year was provided.

Beyond the deficiencies noted above, the Illinois EPA rejects the provisional variance request because it fails to provide a definite compliance plan, including the date of completion and return to compliance. The request does not evaluate all reasonable compliance alternatives beyond that proposed, nor does it describe any adverse impacts from the variance and the extent of those impacts.

The above reasons for rejection are based both on the provisional variance request being incomplete under the requirements of 35 Ill. Adm. Code 180.202 and being outside the scope of relief provided by provisional variances applying the criteria in 35 Ill. Adm. Code 180.301. In accordance with 35 Ill. Adm. Code 180.203(b)(2), you are advised that you may apply to the Illinois Pollution Control Board for a variance pursuant to Section 35(a) of the Illinois Environmental Protection Act (415 ILCS 5/35(a).

If you have any questions regarding this matter, please contact Roger Callaway of my staff at the telephone number listed above.

Sincerely,

Kenneth R. Rogers, Manager
Compliance Assurance Section
Bureau of Water

March 20, 1997

Illinois Environmental Protection Agency
Bureau of Water
Compliance Assurance Section
2200 Churchill Road
P.O. Box 19276
Springfield, IL 62794-9276

Attention: Mr. Roger Callaway
Compliance Assurance Section

RE: Provisional Variance Request - Chemetco, Inc., Hartford, Illinois
Treated Effluent Discharge/NPDES Permit No. IL 0025747

Dear Mr. Callaway:

CSD Environmental Services, Inc. (CSD) and Chemetco have received your letter dated December 6, 1996 regarding a provisional variance request for discharge of treated waters at Chemetco Inc. (Chemetco). We understand the Illinois Environmental Protection Agency (IEPA) has rejected a provisional variance for the emergency discharge of approximately 575,000 gallons of water into Long Lake (please note our original estimate of 1.2 MG has been revised).

Apparently our letter dated November 27, 1996 was misconstrued to be a request for a provisional variance when in fact we were requesting the Agency's assistance in finding discharge options for the water. In response to your December 6, 1997 letter, CSD, on behalf of Chemetco, is herein proceeding under 35 Ill. Adm. Code, Part 180 with a request for a provisional variance. Enclosed please find a complete application as required by Section 180.202.

If you have any questions please feel free to contact me at the number above.

Sincerely,

Cindy S. Davis
President

cc: Greg Cotter, Chemetco
George von Stamwitz, Armstrong, Teasdale, Schlafly & Davis

APPLICATION FOR
PROVISIONAL VARIANCE REQUEST
NPDES PERMIT NO. IL 0025747

PREPARED FOR:

Chemetco, Inc.
Route 3
Hartford, Illinois 62048

MARCH 1997

APPLICATION OR PROVISIONAL VARIANCE REQUEST
MARCH 17, 1997

CHEMETCO, INC.
HARTFORD, ILLINOIS
NPDES PERMIT NO. IL 0025747

Chemetco, Inc. (Chemetco) is requesting a variance from Illinois Administrative Code, Title 35: Environmental Protection; Subtitle C: Water Pollution; Part 312: Treatment Plant Operator Certification for the operation of a treatment unit; Part 309 Permits; Subpart A: NPDES Permits for the discharge of treated water into Long Lake and Subpart B: Other Permits for the construction of a treatment unit. The variance has been prepared in accordance with 35 IAC, Subtitle A, Part 180.

***A description of the business or activity for which the variance is requested, including pertinent data on location, size, and the population and geographic area affected by the applicants operations*:**

On September 17, 1996, Chemetco discovered a storm water discharge had occurred on the south portion of the plant from a storm water discharge pipe which was thought to have been disconnected. Refer to Figure 1 for the location of the spill area. The storm water discharge contained zinc oxide material, a by-product generated by the plant. The discharged material reached and impacted a nearby surface water body, Long Lake. To facilitate removal of the zinc oxide from Long Lake an application was submitted to the U.S. Army Corps of Engineers to construct a diversion channel and two dams. A permit for construction was granted by the Corps of Engineers on September 19, 1996. The diversion channel and dams were constructed and the impacted water from Long Lake was pumped in a temporary containment area, labeled Containment Area #2 on Figure 2, for temporary storage. Approximately 575,000 gallons of water is temporarily stored in Containment Area #2.

Chemetco is located within a primarily agricultural, light residential area south of Hartford and is bounded on the west by a major, heavily traveled, rail and highway (Route 3) and on the south by a limited use secondary road, Oldenberg Road. The 12 acre plant site is in the Southeast 1/4, Section 16, Township 4 North, Range 9 West, of the Third Principal Meridian, in Madison County. Refer to Figure 1 for a location map.

A variance is requested for: 1) the installation and operation of a portable/temporary treatment system to treat impounded water by means of the addition of a polymer to remove suspended solids and heavy metals from the wastewater; 2) discharge of the treated water into Long Lake; and 3) operation of the temporary treatment unit without an operator certification. Due to the time constraints of the NPDES permitting process, Chemetco is requesting permission from the Board to treat and discharge the waters contained in response to the zinc oxide spill, in order to prevent any further uncontrolled accidental discharges. Containment Area #2 is at 100% capacity and Chemetco is fearful that any additional precipitation will result in an uncontrolled, unpermitted discharge. The variance is only requested to cover discharges for the period of time prior to issuance of an NPDES and operating permit from the IEPA for the proposed permanent storm water treatment system. Within 60 days, Chemetco will be applying for an NPDES permit and a construction permit to allow for the installation of a permanent wastewater treatment system designed to manage not only the remaining wastewaters associated with the zinc oxide spill containment and cleanup activities, but also the storm water runoff generated from the entire facility.

The quantity and types of materials used in the process or activity for which the variance is requested, as appropriate:

Chemetco proposes to treat the approximate 575,000 gallons of water impounded in Containment Area #2 through the addition of a polymer to remove the solids (and associated heavy metals) from suspension. Colloid Environmental Technologies Company (CETCO), Arlington Heights, Illinois has completed a treatability study on the contained waters for purposes of designing a temporary treatment system to meet the general effluent standards of 35 IAC, Subtitle C, Part 304. Attachment 1 provides a copy of the results of the treatability studies completed for this project.

Based upon the data generated from the treatability study, CETCO has developed a temporary treatment system design comprised of chemical coagulation/precipitation and filtration. A process flow diagram and outline identifying the general design criteria of the system is incorporated under Attachment 2. Figure 2 provides a site map identifying the location of the proposed temporary treatment system and the related outfall of the treated effluent.

For purposes of monitoring the system, Chemetco proposes to collect samples of the treated effluent waters during the initial startup of the system and weekly thereafter until the project is complete. In the event analysis reveals exceedence of the discharge limits, the system will be shutdown, subjected to evaluation and adjustment as necessary. During the re-startup of the system, additional sampling and analysis of the treated effluent will be completed to demonstrate compliance with effluent discharge standards. Analysis results of all sampling efforts associated with the temporary treatment system will be provided to the Agency.

The quantity, types and nature of materials or emissions to be discharged, deposited or emitted under the variance, and the identification of the receiving waterway or land, or the closest receiving Class A and Class B land use, as appropriate:

Approximately 575,000 gallons of treated water is proposed to be discharged into Long Lake. Refer to Figure 1 for the location of Long Lake. Long Lake is intermittent on Chemetco's property. The lake was dry on the east edge of Chemetco's property during the Fall of 1996. Figure 1 shows the location where the lake is dry on Chemetco's property.

The quantity and types of materials in drinking water exceeding the allowable content, or other pertinent facts concerning variances from the Board's public water supply regulations.

A sample of the untreated water was collected and analyzed for the NPDES discharge parameters specified in Chemetco's NPDES permit. Table 1 provides a summary of the sample results and a comparison to the General Effluent Standards as defined in 35 IAC, Subtitle C, Part 304. Exceedences of the standards were found for cadmium, copper, iron, manganese, lead, suspended solids, and zinc. Chemetco is proposing to treat the water to ensure compliance with the applicable standards prior to discharge.

An assessment of any adverse environmental impacts which the variance may produce:

No environmental impact is expected to occur from the discharge of this water. Only treated water is proposed to be discharged to Long Lake.

A statement explaining why compliance with the Act, regulation or Board Order imposes arbitrary and unreasonable hardship:

Due to time constraints of the NPDES permitting process, Chemetco is requesting permission from the Board to discharge this water prior to the IEPA granting an NPDES permit in order to prevent an uncontrolled accidental discharge. Containment Area #2 is currently at 100% capacity. Also, dewatering is necessary to remove the waste stockpiled in Containment Area #1. Water generated from the dewatering process will need to be added to Containment Area #2. Waste removal from Containment Area #1 cannot begin until the water temporarily stored in Area #2 is removed. Additionally, under similar argument, Chemetco is requesting the variance from the permit requirements of Subtitle C, Section 309 for the installation and operation of a temporary wastewater treatment system which will be required to treat the contained waters in order to meet the applicable effluent discharge standards.

A relief from the operator requirements of Section 312 is also requested due to the time constraints involved with the certification process itself. Chemetco proposes the assignment of an on-site plant employee who will be trained in the operation of this unit. This person will operate the temporary system under the direction and supervision of CETCO and will additionally apply for operator certification which will allow for his/her qualification in the operation of the temporary unit as well as the permanent wastewater treatment system proposed for construction. However, contingent upon the timeliness of the certification process, the designated operator may not be able to obtain certification prior to the initiation of the temporary treatment system's operation.

Chemetco will apply for a NPDES and construction permit for the installation of a permanent wastewater treatment system which will be designed not only to manage any residual wastewater generated from the subject spill's corrective action activities, but also designed to manage the entire plant's storm water run-off. Chemetco is requesting a provisional variance for the interim period until the permanent treatment system is in operation. Chemetco only anticipates the treatment of the existing impounded waters at this time, however, heavy rains or continued corrective action (dewatering) activities may exceed the continued safe temporary containment capacity within this area and necessitate further pre-treated discharge under this variance.

A description of the proposed methods to achieve compliance with the Act, regulations or Board Order, and a timetable for achieving such compliance:

An NPDES permit and a construction permit application will be submitted within 60 days of the date of this letter for the installation of a permanent wastewater treatment system which will be designed to manage the remaining corrective action wastewaters generated from the spill response cleanup in addition to managing the entire plant's storm water runoff.

A discussion of alternate methods of compliance and the factors influencing the choice of applying for a provisional variance:

The site is not serviced by a sanitary sewer. Several wastewater treatment plants were contacted regarding acceptance of the wastewater. None of the plants would accept the water untreated. Plant personnel at Chemetco were interviewed to determine if the water could be used as non-contact cooling water. The plant can accept some of the water, but since storm water is also used as non-contact cooling water, the amount of water which can be used varies depending upon the amount of rainfall received at the plant. Plant personnel estimate it could take up to 3 years or longer to dewater Containment Area #2. The construction permit granted by the Army Corp of Engineers requires complete restoration of the property by September 19, 1997.

A statement of the period, not to exceed 45 days, for which the variance is requested:

A variance is requested for 45 days from the day the first discharge occurs. Chemetco proposes to notify the Agency within 10 days of the first discharge. An exact date of discharge cannot be provided at this time. Chemetco is anticipating the installation of the temporary treatment system within 15 days of the Board's approval of this variance. In the event additional discharges beyond that necessary to drain the existing impounded waters is required (prior to the installation and operation of the permanent wastewater treatment system), Chemetco will request an extension to the variance.

Chemetco is requesting this variance to prevent an uncontrolled accidental breaching of the impoundment.

A statement of whether the applicant has been granted any provisional variances within the calendar year, and the terms and duration of such variances:

Chemetco has not been granted any provisional variances within the past year.

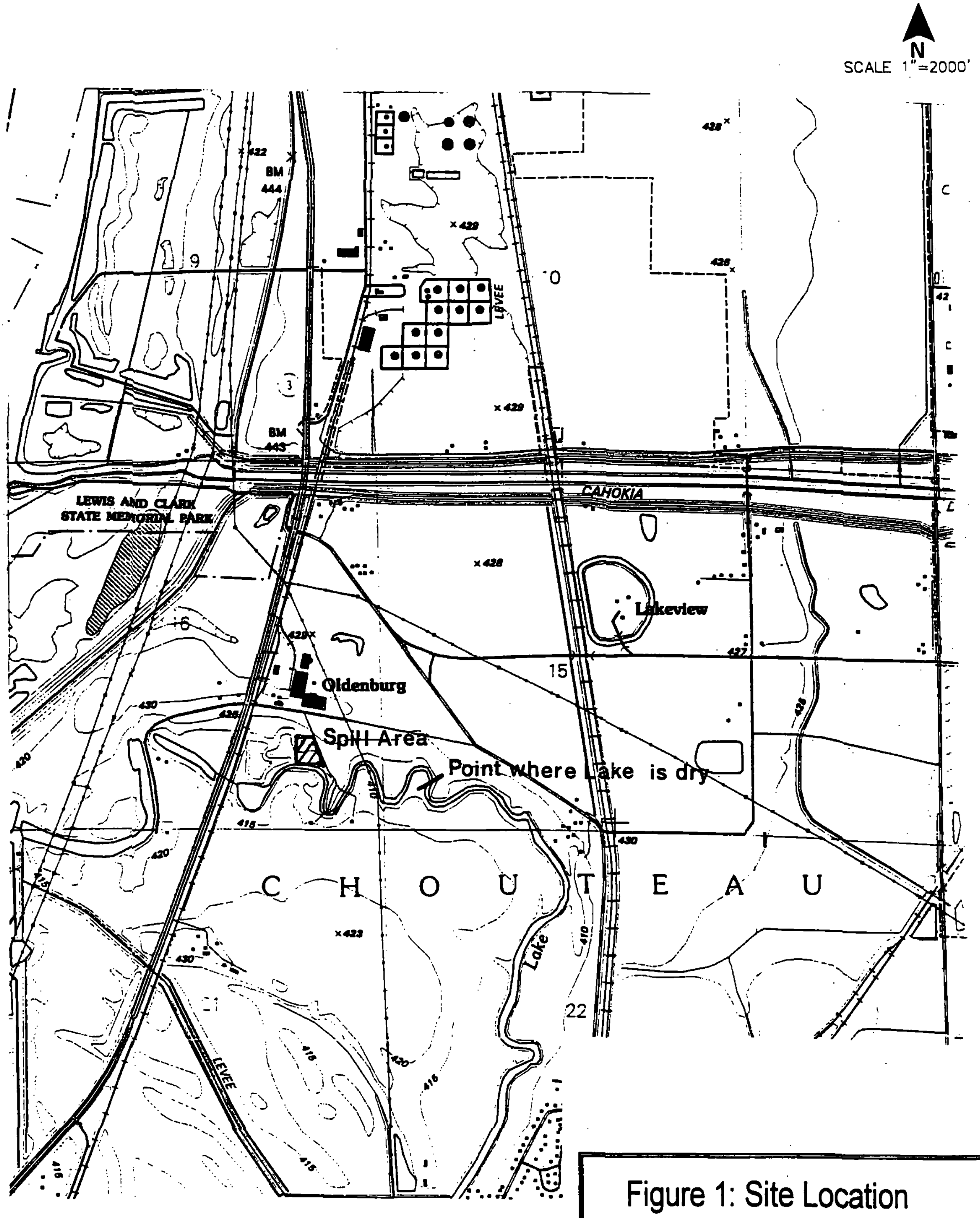
A statement regarding the applicants current permit status as related to the subject matter of the variance request:

The applicant currently has an NPDES permit for discharge of storm water. A new application specific to the installation of a permanent on-site wastewater treatment system designed to manage the remaining wastewaters associated with the subject zinc oxide spill response activities, and to manage the entire plant's storm water runoff, will be submitted within 60 days of the date of this variance request.

Any Board orders in effect regarding the applicant's activities and any matters currently before the Board in which the applicant is party:

Chemetco currently has before the Board a petition for an adjusted standard under 35 Ill. Adm. Code 720.131(a) & (c). This petition is in regard to a pile of zinc oxide material stored at Chemetco and is not related to this variance request.

LIST OF FIGURES AND ATTACHMENTS:



Source: USGS Topographic Map
Wood River, IL - 7.5'

Figure 1: Site Location

Chemetco, Inc. - Hartford

CSD Environmental Services, Inc.

CHEMETCO, INC.
Hartford, Illinois

TABLE 1
Water Sample Result from Containment Area #2
Collected on October 11, 1996
Analyzed for NPDES Discharge Parameters
Total Metals

Parameter	Result in mg/l	General Discharge Standard
Silver	0.021	0.1
Boron	5.54	*
BOD	<7.5	30
Cadmium	0.563	0.15
Chlorine	<0.05	*
Copper	1.20	0.5
Iron	2.57	2.0
Hexane soluble Oil and Grease	11.5	15.0
Manganese	2.42	1.0
Nickel	0.14	1.0
Lead	1.59	0.2
Suspended Solids	67	15.0
Zinc	6.63	1.0

Those samples exceeding the General Use Standard as defined in 35 Ill. Adm. Code, Subtitle C, Part 304 are highlighted.

* No standard has been established in 35 Ill. Adm. Code, Subtitle C, Section 304.

PROVISIONAL VARIANCE REQUEST

Chemetco, Inc., Hartford, Illinois
NPDES Permit No. IL0025747

ATTACHMENT 1:

Treatability Test Results

MARCH 1997

ENVIRONMENTAL
SYSTEMS
INCORPORATED
38 Lenexa
Business Center
9900 Pflumm Road
Lenexa, KS 66215
Office (913) 888-6060
FAX (913) 888-2564

Chemetco
Proposed
Temporary Impoundment
Water Treatment
Process Description

Primary Coagulant pH Adjustment Tank (Primary Coagulation Tank):
The waste water will be pumped at 200 to 300 gpm from the impoundment area to a primary pH adjustment tank. During the pumping process a primary coagulant (reagent "A") would be injected inline via metering pumps to aid in metals removal and increasing flocculation particle mass. Reagent "A" is a sodium bentonite clay based material selected for its ion exchange capabilities. In the dosage range of 75 to 150 ppm the exchange allows for increases in clarity and trace metals removal. Sulfuric acid and sodium hydroxide would be used to optimize the pH required for precipitation of the metals waste. During the laboratory bench scale the optimum metals removal occurred at 9.5 pH.

Waste water will flow from the Primary Coagulation Tank to the metals precipitation unit. Metals precipitation reagent "B" would be injected inline just after the Primary Coagulation Tank. Reagent "B" is an organic / inorganic heavy metal precipitant. Reagent "B" would be injected using a metering pump system to control dosage rates.

After the flocculant (reagent "C") has been injected via a metering pump, the preconditioned waste water will flow to the Metal Precipitation Unit. Reagent "C" will be both cationic and anionic in charge characteristics.

Metal Precipitation Unit:
The physical separation of the flocculated metals and the waste will take place during this operation. The separated sludge will be collected and transferred for further processing and the treated waste water will flow to the Post Treatment pH Adjustment Tank.

Post Treatment pH Adjustment Tank:
This tanks primary function is to maintain a pH level in accordance with the NPDES discharge requirements. The Post Treatment pH Tank will allow the primary treatment system to operate at any optimum pH level without the discharge pH limit dictating the pH of the treatment process. Sulfuric acid and sodium hydroxide will be used as pH adjustment reagents. Water will be pumped from the Post Treatment pH Adjustment Tank to a pair of polishing filters.

Polishing filters:
The polishing filters will be operated in a lead/lag manner. The primary unit will be in operation and the secondary unit will be placed into operation when the primary unit needs service, minimizing potential down time. The polishing filters will contain a media capable of obtaining the 15.0 ppm NPDES suspended solid discharge requirements.

Batch Release Holding Tanks:
These two tanks will be operated as batch release tanks. The batch release process would allow periodic sampling and/or testing of the accumulated cleaned waste water prior to discharge and assurance of NPDES parameter compliance.

Dewatering:
No further addition of treatment reagents should be needed for this operation. The dewatering process will be a mechanical separation (i.e. plate and frame filter press) of the solids and the liquids producing a solid with approximately 50 % dry solids. The solid material will be recycled at the Chemetco facility and the separated liquid would be returned to the primary treatment system for discharge.

ENVIRONMENTAL
SYSTEMS
INCORPORATED
38 Lenexa
Business Center
9900 Pflumm Road
Lenexa, KS 66215
Office (913) 888-6060
FAX (913) 888-2564

Chemetco

Impoundment

Bench test analytical

NPDES Requirements		**Bench scale analytical**		
Limits		**Before treatment**	**After treatment**	
	mg/l	mg/l	mg/l	mg/l below limit
Boron	none			
Cadmium	0.15	0.099	<.016	0.051
Copper	0.50	0.119	<.010	0.381
Iron	2.00	0.728	0.298	1.272
Lead	0.20	0.043	<.050	0.157
Manganese	1.00	0.579	0.246	0.421
Nickel	1.00			
Silver	0.10			
Zinc	1.00	2.05	0.094	1.050
O & G Hexane Method	15.00			
Suspended Solids	15.00			
BOD	30.00			
Chlorine	none			

Bench scale testing results:
All laboratroy analysis were performed by a state certifiec analyticial laboratory in accordance with EPA regulations and procedures.

Although suspended sloids were not tested in the laboratory, it will require no alteration of the recommended process to comply with the NPDES requirement of 15.0 mg/l.

Blanks indiate no testing was performed .

ENVIRONMENTAL
SYSTEMS
INCORPORATED
38 Lenexa
Business Center
9900 Pflumm Road
Lenexa, KS 66215
Office (913) 888-6060
FAX (913) 888-2564

Chemetco

Impoundment

Bench test analytical

NPDES Requirements		Bench scale analytical		
Limits		**Before treatment**	**After treatment**	
	mg/l	mg/l	mg/l	mg/l below limit
Boron	none			
Cadmium	0.15	0.099	<.016	0.051
Copper	0.50	0.119	<.010	0.381
Iron	2.00	0.728	0.298	1.272
Lead	0.20	0.043	<.050	0.157
Manganese	1.00	0.579	0.246	0.421
Nickel	1.00			
Silver	0.10			
Zinc	1.00	2.05	0.094	1.050
O & G Hexane Method	15.00			
Suspended Solids	15.00			
BOD	30.00			
Chlorine	none			

Bench scale testing results:
All laboratory analysis were performed by a state certified analytical laboratory in accordance with EPA regulations and procedures.

Although suspended solids were not tested in the laboratory, it will require no alteration of the recommended process to comply with the NPDES requirement of 15.0 mg/l.

Blanks indiate no testing was performed .

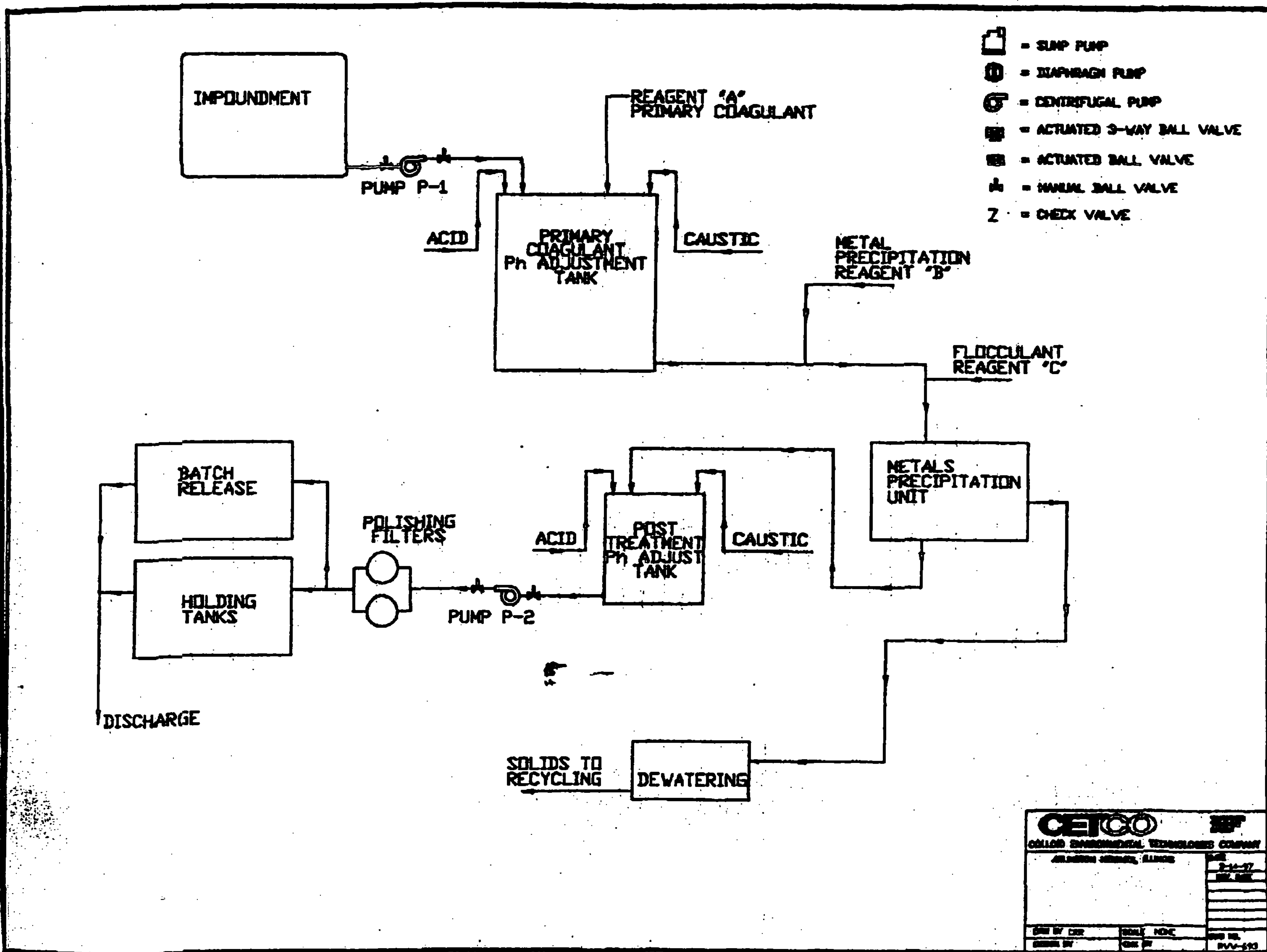
PROVISIONAL VARIANCE REQUEST

Chemetco, Inc., Hartford, Illinois
NPDES Permit No. IL0025747

ATTACHMENT 2:

Treatment System Design Flowchart and Process Description

MARCH 1997


IMPOUNDMENT
PUMP P-1
REAGENT "A"
PRIMARY COAGULANT
ACID
PRIMARY COAGULANT Ph ADJUSTMENT TANK
CAUSTIC
METAL PRECIPITATION REAGENT "B"
FLOCCULANT REAGENT "C"
METALS PRECIPITATION UNIT
BATCH RELEASE
HOLDING TANKS
POLISHING FILTERS
PUMP P-2
ACID
POST TREATMENT Ph ADJUST TANK
CAUSTIC
DISCHARGE
SOLIDS TO RECYCLING
DEWATERING
= SUMP PUMP
= DIAPHRAGM PUMP
= CENTRIFUGAL PUMP
= ACTUATED 3-WAY BALL VALVE
= ACTUATED BALL VALVE
= MANUAL BALL VALVE
Z = CHECK VALVE
CETCO
SCALE NONE

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director
2200 Churchill Road, Springfield, IL 62794-9276
217/782-9720

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

March 31, 1997

Cindy S. Davis, President
CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, Illinois 62703

Re: Provisional Variance Request-Chemetco, Inc.-NPDES Permit No. IL0025747

Dear Ms. Davis:

The Illinois Environmental Protection Agency ("Illinois EPA") has completed a preliminary review of the provisional variance request, received on March 26, 1997, that you submitted on behalf of Chemetco, Inc. Pursuant to 35 Ill. Adm. Code 180.203, the Illinois EPA hereby rejects your application for provisional variance for the reasons listed below.

1. The Illinois EPA believes that the hardship in the petition is self-imposed due to Chemetco, Inc. being aware at least since November, 1996 of the need to apply for an NPDES permit modification and a construction permit application. The required permits could have been issued by the Illinois EPA if they were applied for during 1996.

2. Chemetco has indicated (page four) that they may be applying for a variance extension beyond the 45 day initial variance request. Title 35, Subtitle A, Subpart C, Section 180.301 states that a provisional variance cannot exceed 45 days in length.

3. The provisional variance request fails to provide a definite compliance plan, including the date of completion and return to compliance.

The above reasons for rejection are based on being outside the scope of relief provided by provisional variances applying the criteria in 35 Ill. Adm. Code 180.301. In accordance with 35 Ill. Adm. Code 180.203(b)(2), you are advised that you may apply to the Illinois Pollution Control Board for a variance pursuant to Section 35(a) of the Illinois Environmental Protection Act (415 ILCS 5/35(a)).

If you have any questions regarding this matter, please contact Roger Callaway of my staff at the telephone number listed above.

Sincerely,

K R Rogers

Kenneth R. Rogers, Manager
Compliance Assurance Section
Bureau of Water

ATTACHMENT 8

TCLP Results

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 18 February 1997
Date Received: 19 February 1997
Date Analyzed: 25 February 1997
Date Reported: 26 February 1997

Project: Chemetco

PAS Project Code: CSD-148

Sample Description: Woodpile

PAS Sample No.: 9702190699

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	E.P.A. Method	STORET Number	Regulatory Limit mg/l
Cadmium	0.005	1.10	6010A	99016	1.00
Lead	0.0075	7.15	6010A	99020	5.00
Zinc	5.0	59.9	6010A	99026	5.00

Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Form PAS-TCLPIM

Chain of Cu[illegible]dy Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD Environmental Inc	Project	CHEMETCO
Address	2220 Yale	Contact Person	M. Simmering / Cindy Davis
City, State, Zip	SPFLD IL 62703	P. O. #/ Invoice to:	CSD Env. Inc.
Phone Number	522-4085	Facsimile Number	522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling Date	Sampling Time	Container Size	Container No.	Preservative	Analysis Requested	PAS Sample Number
STORM WATER	H_2O	2/18	P.M.	–	–	–	SEE ATTACHED PARAMETERS	0698
WOODPILE	Soil	2/18	P.M.	–	–	–	TCLP CADMIUM, LEAD, ZINC	0699
							NOTE:	
							DETECTION LIMIT FOR WOODPILE =	
							CD < 0.005 Mg/L	
							PB < 0.0075 Mg/L	
							ZN < 5.0 Mg/L	

Relinquished by: Marc Simmering		Received by: Scott [illegible]	
Date: 2/19/97	Time: 2:20	Date: 2/19/97	Time: 1420 hrs
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-148

Form PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Smapler.

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

SHREDDED WOOD

CSD Environmental Services		Date Sampled:	15 April 1997
2220 Yale Boulevard		Date Received:	18 April 1997
Springfield, IL 62703		Date Analyzed:	22 April 1997
		Date Reported:	23 April 1997

Project: Chemetco

PAS Project Code: CSD-158

	Comp-1	Comp-2
Sample Description:	Comp-1	Comp-2
PAS Sample Number:	9704181978	9704181979

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.004	2.6	0.81	6010A
Lead	0.04	12.4	3.60	6010A
Zinc	0.002	104	32.4	6010A

Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Form PAS-RWMET2

Chain of Custody Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD ENVIRONMENTAL SERVICES	Project	CHEMETCO
Address	2220 YALE BLVD	Contact Person	SHANE THORPE
City, State, Zip	SPRINGFIELD, IL 62703	P. O. #/ Invoice to:	
Phone Number	217/522-4085	Facsimile Number	217/522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling Date	Sampling Time	Container Size	Container No.	Preservative	Analysis Requested	PAS Sample Number
STW-1	H_2O	4/18	AM	1	500 ML		TOTAL ORGANIC CARBON	1971
W-1	~~[illegible]~~						ZINC, COPPER, CADMIUM, LEAD	1972
W-2								1973
W-3								1974
W-4								1975
W-5								1976
W-6								1977
~~[illegible]~~	~~[illegible]~~	4/15	AM	BAG SAMPLES				
COMP-1	WOOD						TCLP LEAD, CADMIUM, + ZINC	1978
COMP-2								1979
NE-SOIL	SOIL	4/18	AM				SODIUM HYDROXIDE ?	1980

Relinquished by: Shane A Thorpe		Received by: Scott A R[illegible]	
Date: 4/18/97	Time: 3:17 pm	Date: 4-18-97	Time: 1515 hrs
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-158

Form PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Smapler

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 10 June 1997
Date Received: 11 June 1997
Date Analyzed: 13 June 1997
Date Reported: 16 June 1997

Project: Chemetco

PAS Project Code: CSD-174

Sample Description: Rock

PAS Sample No.: 9706113331

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	E.P.A. Method	STORET Number	Regulatory Limit mg/l
Cadmium	0.004	7.80	7131A	99016	1.00
Lead	0.04	16.83	6010A	99020	5.00
Zinc	0.001	503	6010A		

Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Chain of Cu...ody Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD ENVIRONMENTAL	Project	CHEMETCO
Address	2220 YALE BLVD.	Contact Person	CINDY DAVIS
City, State, Zip	SPRINGFIELD, IL 62703	P. O. #/ Invoice to:	
Phone Number	217/522-4085	Facsimile Number	522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling		Container		Preser-vative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			
Z-1	SOLID	6/10	AM	4oz	1		BULK DENSITY	3329
OO-1	↓	↓	↓	4oz	2		TCLP METALS + TCLP ORGANICS	3330
ROCK	↓	↓	↓	GAL BAG	1		TCLP Pb + Cd & Zn	3331
							As Per Cindy D	
							13 JUN 97 SL	

Relinquished by: Shane A Thorpe		Received by: Scott A Kerr	
Date: 6/11/97	Time: 8:45 AM	Date: 6-11-97	Time: 0845 hrs
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-174

Form PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Smapler

ATTACHMENT 9

Groundwater Sampling and Analysis Procedures

1.0 Introduction

This Sampling and Analysis (S&A) plan describes procedures and techniques for sample collection, sample preservation and shipment, analytical procedures, chain of custody control, and quality assurance for groundwater monitoring at Chemetco Inc.'s Hartford, Illinois facility. Copies of this plan will be distributed to personnel performing key tasks in the groundwater monitoring program, and a copy will be maintained onsite at the Chemetco facility. The written procedures of this plan will be followed by all Chemetco and contractor personnel involved in the monitoring program.

This sampling and analysis plan addresses procedures for Phase I groundwater monitoring at the Chemetco, Inc., facility at Hartford, Illinois. Additional discussion of the monitoring program is provided in Section 7 of this document.

Consistent sampling and analytical procedures are necessary to ensure the validity of groundwater monitoring data. The following items will be considered individually in this section:

- Sample collection procedures;
- Sample Preservation and handling;
- Chain of custody;
- Analytical procedures; and
- Quality assurance/quality control.

The goal of this program is accurate measurement of groundwater movement and to determine the presence or absence of hazardous constituents in the groundwater.

2.0 Sample Collection Procedures

To ensure samples obtained from the monitoring well network are representative and that results from various sampling rounds are comparable, the following subsections describe procedures to be followed during sample collection.

2.1 Determination of Water Elevations

Depth to groundwater is measured for each well prior to sampling, and is used to calculate the volume of water to be evacuated. Water elevation data will be evaluated to determine if the groundwater monitoring wells continue to be adequately located to provide representative upgradient and downgradient monitoring data.

Depth to standing water and the total depth of each well will be measured to the nearest 0.01 foot using an electronic water level indicator and a steel tape. Measurements are taken relative to the top of the casing which are surveyed and referenced to National Geodetic Vertical Datum (NGVD)

The presence and thickness of immiscible layers will be investigated in accordance with the USEPA's Technical Enforcement Guidance Document (TEGD) if either immiscible layers are known to occur or are determined to potentially occur after considering the waste types managed at the facility. At this time, the presence of immiscible layers is not anticipated.

2.2 Well Evacuation

Standing water is removed from the well by bailing prior to sampling. The volume of water in the well is calculated using the initial water elevation, diameter of the well and total depth of the well. Figure 2.2.1 depicts a method for calculating the purge volume. Each well must be bailed until three well volumes have been removed or the well is dry and field parameters have stabilized.

Bailing equipment consists of Teflon or stainless steel or disposable bailers and new polypropylene or nylon rope. Non disposable bailers will be thoroughly decontaminated between wells to avoid the potential for cross contamination. The bailer is detergent cleaned and acid rinsed prior to bailing; ropes are dedicated to each well. The cleaning procedure for the bailer consists of cleaning with a non-phosphate detergent followed by rinsing with dilute hydrochloric acid or nitric acid, then rinsing with tap water and finally, rinsing with Type II reagent grade water. All water removed from the well along with decontamination fluids will be appropriately containerized and disposed of upon receipt of laboratory analyses.

2.3 Sample Withdrawal

Water elevations are measured to determine if recharge has been sufficient to collect samples from the well. Teflon, stainless steel, or disposable bailers should be used; the bailer should be cleaned and rinsed as described in Section 2.2. The bailer should be lowered into the well with a cable and samples should be collected within 24 hours after the wells are purged. Due to problems with high turbidity in some wells at the facility, Chemetco proposes to wait 24 hours before sampling due to past problems obtaining samples with very high turbidity. The upgradient well will be sampled first followed by the downgradient wells. The sampling should proceed as follows:

- Select a new or cleaned bailer.

- Check the operation of check valve assemblies to confirm free operation.

- Attach bailer to cable. The cable should be of sufficient length to allow for water-level drawdown during sampling. Clean sampling equipment should not be placed directly on the ground. Use a drop cloth and feed the cable from clean reels. The cable should be wiped with deionized water and air dried before it is rewound onto the reel.

- Lower bailer slowly until it contacts the water surface.

- Allow bailer to sink and fill with minimal surface disturbance to minimize degassing of water.

- Slowly raise bailer to surface. Do not allow bailer line to contact ground. Place bailer line on protective liner.

- Open bottom emptying device to allow slow discharge and ensure the water flows gently down the side of the sample bottle with minimal entry turbulence. Measurements of pH, temperature, specific conductance, and turbidity should be obtained from the first sample.

- Repeat above steps as needed to acquire a sufficient sample volume to fill all containers.

Special care should be taken in transferring water from the bailer to sample containers so that the sample is not aerated. This is a concern for metal samples so that oxidation is avoided.

All information gathered during collection of groundwater samples should be recorded on a sample collection form, essentially the same as the one shown in Figure 2-3.

3.0. Sample Preservation and Shipment

Groundwater samples must be preserved and analyzed properly to account for the instability of certain compounds. Proper preservation techniques and sample containers are necessary to ensure valid analyses. Table 3-1 specifies preservation and containerization requirements associated with parameters to be sampled for at Chemetco. In addition, the minimum sample volume required for analysis, as well as the maximum holding time, is given.

All samples will be placed in coolers immediately after collection and held at 4 degrees C. During all field activities sample blanks will be used to ensure sampling integrity. Blanks will be handled and analyzed according to the same procedures as other samples. All samples will be securely packed and expeditiously shipped in a sealed cooler to the laboratory designated for analysis.

4.0. Chain of Custody

Proper sample tracking requires thorough documentation of all aspects of the sampling process from initial collection to laboratory analysis.

4.1. Field Notebook

To document field sampling procedures, the following information will be recorded in a field notebook:

- Well Identification;

- Well Depth;
- Name of collector;
- Date and time of well purging;
- The physical condition of each well, bailer and sampling location;
- Weather conditions, temperature;
- Purging and sampling conditions for the wells;
- Water level prior to purging;
- Observation of water appearance;
- Calibration of field measurement apparatus;
- Sample ID;
- pH of samples;
- Specific conductance of samples;
- Temperature of samples;
- Problems encountered and any deviation from the proposed groundwater monitoring plan

4.2. Sample Labels

Each sample will be identified with a unique identification number and labeled with a sample tag. The information recorded on the sample label includes;

- Well Number - the monitoring well identification;
- Date - a six-digit number indicating the year, month and day of collection;
- Time - a four-digit number indication the military time of collection;
- Sample number - a number that may include the above information, but that must distinguish among samples collected from the same sampling point at the same time;
- Sampler - Signature of person collecting the sample;
- Analyses required;
- Preservatives used; and
- Remarks - any pertinent observations or further sample description.

4.3. Sample Seals

When samples are shipped to a laboratory by a common carrier, shipping containers will be sealed with chain of custody tape. The tape will be signed and dated by the person applying the seal.

4.4. Chain of Custody Record

Samples are accompanied by a Chain-of-Custody Record (Fig 4.4) from the time they are collected. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on record. This record documents sample custody transfer from the sampler, often through another person, to the analyst at the laboratory.

Minimum information recorded on the chain-of-custody record in addition to the signatures and dates of all custodians will include:

- Sample number;
- Signature of collector;
- Date and time of collection;
- Sample type (e.g., groundwater, immiscible layer);
- Identification of well;
- Number of containers;
- Parameters requested for analysis;
- Preservatives used;
- Internal temperature of shipping (refrigerated) container (chest) when samples were sealed into shipping container;
- Maximum temperature recorded during shipment;
- Minimum temperatures recorded during shipment; and

- Internal temperature of shipping (refrigerated) container upon opening in the laboratory.

The chain-of-custody record is employed in the following step-by-step procedure from sample collection to laboratory analysis:

1. Samples will be packaged properly for shipment and dispatched to the appropriate laboratory for analysis with a separate custody record accompanying each shipment. Shipping containers will be sealed with chain-of-custody tape for shipment to the laboratory. The chain-of-custody tape will be signed and dated by the person applying the seal. The method of shipment, courier name(s) and other pertinent information are entered in the "Remarks" box on the form.

   The shipper's waybill or air bill is retained by the last custodian prior to shipment.

2. Whenever samples are split with another laboratory, it is noted in the "Remarks" section. The note indicates with whom the samples are being split and is signed by both the sampler and recipient. The split samples are thenceforth covered under separate chain-of-custody procedures. If either party refuses a split sample, this will be noted and signed by both parties. The person relinquishing the samples should request the signature of a representative of the receiving party, acknowledging receipt of the samples. If a representative is unavailable or refuses to sign, this is noted in the "Remarks" section. When appropriate, as in the case where the representative is unavailable, the custody record should contain a statement that the samples were delivered to the designated location at the designated time.

3. The original record will accompany the shipment, and a copy will be retained by the sampling technician.

4. The receiving laboratory's sample log should indicate the condition of the samples as received, and should explicitly state whether the chain-of-custody seal is intact.

5. The receiving laboratory should retain a copy of each chain-of-custody record, with the shipper's waybill or air bill attached.

4.5. Sample Analysis Request Sheet

A sample analysis Request Sheet will accompany each sample on delivery to the laboratory, and will identify the analyses to be performed on each sample container. The form will contain the sample number and location, the name of the person receiving the sample, analyses to be performed, date of sampling and sample receipt, addition of any preservatives, internal temperature of shipping container upon opening in the lab and the lab performing the analysis.

4.6. Laboratory Notebook

The laboratory performing the analytical work will maintain a notebook and will log the samples in upon receipt, making note of their condition and any problems that may exist, such as broken containers or missing sample labels, sample preservation techniques, instrumental methods, time, date, and name of the person performing each processing step and experimental conditions.

5.0. Analytical Methods and Procedures

All groundwater samples will be analyzed in the field, immediately after collection for temperature, pH and specific conductance. The conductivity meter and temperature meter will be calibrated according to manufacturer's instructions prior to each sampling period. The pH meter will be calibrated in the field, prior to and following each pH measurement using a fresh standard buffer solution. The results of calibrations and any problems with the operation of equipment will be recorded in the field notebook.

All analyses specified in this groundwater monitoring plan will be conducted in accordance with EPA approved analytical procedures. An independent laboratory is proposed to be utilized for the analytical work to be performed on samples collected at Chemetco.

Table 5.1 lists the analytical procedures to be used for the analyses of groundwater samples. All samples must be analyzed within the holding times specified in Table 3.1. If, for some reason, a cited method cannot be used at the time of analysis, an equivalent approved method will be utilized that meets the performance applications.

6.0. Quality Control/Quality Assurance Procedures Field and Lab

Quality Control/Quality Assurance (QA/QC) procedures are conducted by sampling and analysis personnel to ensure the reliability and validity of data gathered. QAQC procedures include the explicit sample collection, preservation, analysis, and documentation requirements addressed in earlier sections of this plan, as well as the use of blanks, duplicates, spikes, and standards as described below.

6.1. Field QAQC

Field QAQC procedures include collection of sample duplicates and sampling equipment blanks. A minimum of one per twenty samples will be collected in duplicate. Duplicate samples will be identified as such of the Field Logsheet, but not on the labels or on the chain-of-custody forms. Information recorded on the labels and chain-of-custody forms for duplicates samples should be the same as for all other samples. Field duplicates are used to measure the precision associated with sampling, or the degree to which sample collection techniques affect the parameters to be measured.

Equipment blanks consist of a daily sample of final decontamination rinsate (D.I. water), collected and recorded as above for the duplicates. The equipment blank is used to detect cross contamination via sampling equipment. If contamination is found in the blank, the source will be identified and corrective actions, including resampling, will be initiated.

6.2. Laboratory QAQC

The laboratories performing the analyses for this program must ensure that adequate QAQC procedures are followed. The laboratories must check the precision and accuracy of analytical methods through the use of standards, duplicates, laboratory blanks and spiked samples.

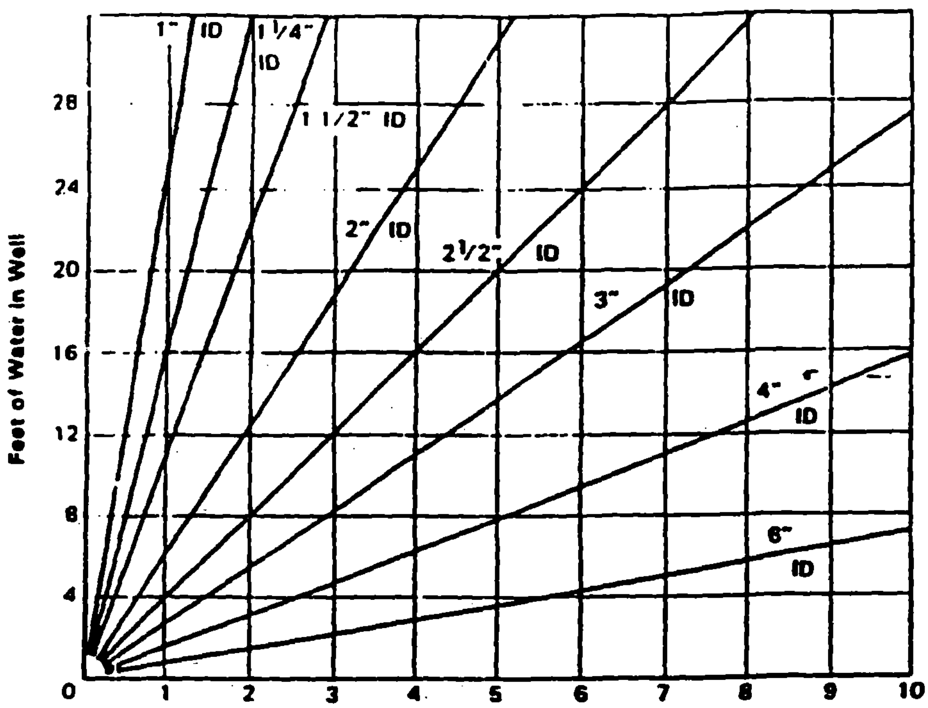
The results of quality control analyses must be recorded in a laboratory notebook; the QC data can be used as a measure of performance and can also provide an indication of potential cross-contamination sources. If a problem is identified, the appropriate corrective action must take place. This may include checking instrumentation for calibration errors or defects; checking procedures; determining the quality and expiration date of reagents and checking calculations for possible errors.

7.0. Statistical Analysis

Statistical procedures are not being proposed at this time since groundwater analyses will be compared to the appropriate 35 Ill. Admin. Code Part 620.

Figure 2-1

Purge Volume Computation



(a) Graphical Explanation

Volume/Linear Ft. of Pipe		
ID(in)	Gal	Liter
1/4	0.003	0.010
3/8	0.006	0.022
1/2	0.010	0.039
3/4	0.023	0.087
1	0.041	0.154
2	0.163	0.618
3	0.367	1.39
4	0.653	2.47
6	1.47	5.56

(b) Volume Factors

FIGURE 2-2

Chemetco

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Chemetco Environmental Management
Groundwater Sampling Logsheet

For: ______________________ Monitoring Well: ____________

Sampler: ______________________ Date: ______________

STANDING VOLUME REMOVAL

Time:
Well Depth:______ft. Diameter of Well: ______in.
____ Depth to water:____ft. Groundwater Elevation:___
Length of Water Column:______ft.
Standing Well Volume:_______gal.
Elevation Top of Casing: _____ft.
____ Began Evacuation
Number of Balers removed:_____
Volume Expelled:__________gal
Bailed Dry?____________
____ Depth to Water (final)______ft.

GROUNDWATER SAMPLING

Sample Purpose: Background_____ Semi Annual_____
Quarterly _____ Annual _____

Time:
____ Began Sampling Method of Collection_________

Samples Collected:

Sample Type	Container Type

____ Finished Sampling
____ Depth to Water (final) _____ft.

ON-SITE ANALYSIS

pH:______________ Specific Conductance:__________UMHO/CM (Corrected to 25°C)
Temp:____________°C Analyst:______________________________

Instruments Used: pH:________________ Buffers:__________ and __________
Spec. Cond:________________ Standard:____________________

Water Conditions: Odor:________________ Color:________________
Sedimentation: Yes or No Sediment Color:________________

Weather:____
Remarks/Observations:____
____

Signature Asserting Accuracy:____

TABLE 3-1 SAMPLE CONTAINERS, PRESERVATION AND HOLDING TIMES

Parameter	Sample Volume	Container	Preservation	Maximum Holding Time
Indicators of Ground Water Quality				
pH	25 ml	Glass, plastic	Determine on site	Analyze immediately
Specific Conductance	100 ml	Glass, plastic	Determine on site	Analyze immediately
Total Organic Carbon	1000 ml	Amber glass with Teflin lined cap	HCl or H_2SO_4 to pH <2; Cool 4°C.	28 days
Total Organic Halogens	1000 ml	Amber glass with	H_2SO_4 to pH<2; Cool 4°C.	7 days
Total Metals				
Lead	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Cadmium	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Chromium	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Zinc	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Arsenic	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Tin	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Copper	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Additional Appendix IX Metals (in fourth quarter)				
Antimony	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Barium	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Beryllium	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Cobalt	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Mercury	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Nickel	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Selenium	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Silver	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months
Vanadium	1000 ml	Plastic	HNO_3 to pH<2; Cool 4°C.	6 months

Table 3-1 (continued)

<u>Semi-Volatile Organics (in fourth quarter)</u>			
All Appendix IX Semi-Volatiles	1000 ml	Glass	Cool, 4°C

Chemetco

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P.O. BOX 187 • ALTON, ILLINOIS 62002

TODAY'S DATE: ____/____/____

CHAIN OF CUSTODY RECORD

SAMPLES SENT TO:

PROJECT NO. PROJECT NAME

SAMPLERS: (Signature)

STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS							REMARKS

RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY:	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY:
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY:	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY:
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY:	DATE	TIME	REMARKS	

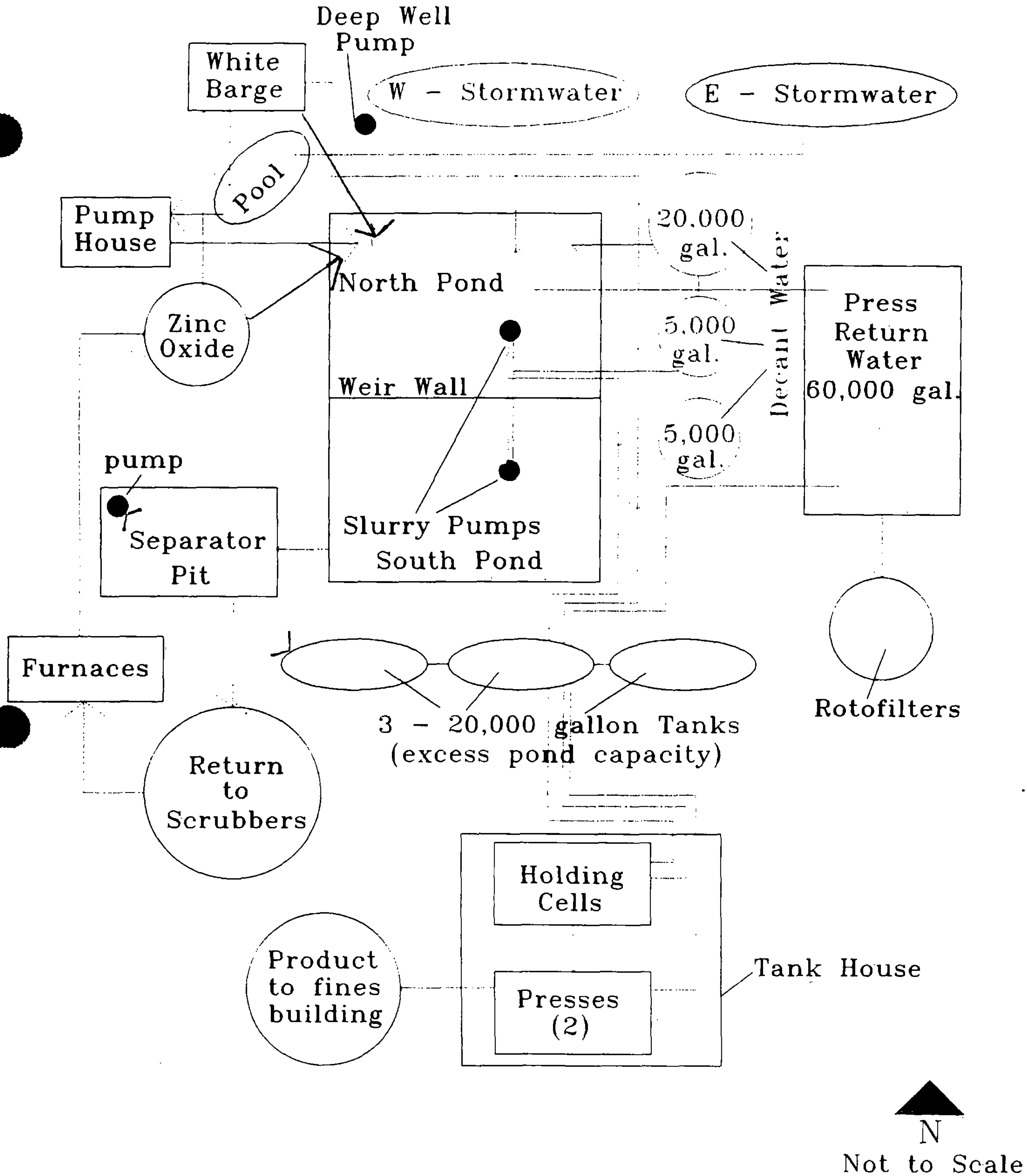
Distribution: Original to Lab, Copy 1 to Field Files, Copy 2 to Project Manager

FIGURE 6-1

TABLE 4-1 Analytical Procedures

Indicators of Ground	Method No.[2]	PQL[1]	C.A.S. RN
pH	9040	6-9	NA
specific conductance	9050	NA	NA
Total Organic Carbon	9060	NA	NA
Total Organic Halogen	9020	NA	NA

Metals	Method No.	PQL	C.A.S. RN
Antimony	7040	2000	Total
Arsenic	7060	10	Total
Barium	7080	1000	Total
Beryllium	7090	50	Total
Cadmium	6010	40	Total
Chromium	6010	70	Total
Cobalt	6010	70	Total
Copper	6010	60	Total
Lead	7421	10	Total
Mercury	7470	2	Total
Nickel	6010	50	Total
Selenium	6010	750	Total
Silver	6010	70	Total
Tin	7870	8000	Total
Vanadium	6010	80	Total
Zinc	6090	20	Total



Legend

Return Water
Zinc Oxide
Decant Water
Make-up Water

Chemetco, Inc.

Flow Schematic
Zinc Oxide Ponds
8-25-97

CSD Environmental Services, Inc.

Response to #23

FILE COPY

CHEMETCO, INC.
WORK PLAN FOR THE IMMEDIATE RESPONSE TO ZINC OXIDE SPILL
Revised October 10, 1996

Prepared by:

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

CSD

Environmental Services Inc.

2220 Yale Boulevard
Springfield, IL 62703
(217) 522-4085

CSD Environmental Services, Inc.

October 15, 1996

Illinois Environmental Protection Agency
Field Operations
Bureau of Land
2009 Mall Street
Collinsville, IL 62234

RE: 1198010003--Madison County
Chemetco, Inc.
ILD048843809
FOS

Attention: Mr. Kenneth G. Mensing
Regional Manager

Dear Mr. Mensing:

Enclosed please find three (3) copies of the *Revised Work Plan for the Immediate Response to the Zinc Oxide Spill* at Chemetco. The Revised Work Plan addresses the comments provided by the Illinois Environmental Protection Agency (IEPA) on September 30, 1996. The IEPA comments are listed below as well as Chemetco's response.

1. **Chemetco must submit as-built scaled drawings of the impoundment area to the Agency.**

Figures 1 and 2 show to a scale of 1" = 150' the spill area and the containment areas.

2. **Chemetco must submit a new work plan containing a detailed description of the decontamination protocol at this site. The plan must include methods for disposal for decontamination of waste.**

A revised work plan is submitted under this cover addressing decontamination protocol and disposal methods.

3. **Inspections of the surface impoundment pursuant to 35 IL Adm. Code 724.115 and 724.326 must be conducted on a daily basis. Chemetco must have contingencies in place to respond to detections of leaks in the impoundment.**

The spill area has been divided into four separate containment areas. Daily inspections for freeboard and erosion will be conducted. Inspection records will be maintained at the facility. In case of leakage from one of the containment areas, the smaller containment areas were constructed within the original larger containment area. In the event one berm of the smaller areas is breached, a larger area will contain the material until the berm can be repaired.

SOY INK 2220 Yale Blvd., Springfield, IL 62703 · Phone 217-522-4085 · FAX 217-522-4087

4. **To avoid making another regulated unit during clean-up, it is recommended that you obtain any necessary permits for waste disposal prior to initiating excavation activities. If it is necessary to store excavated soil and zinc oxide slurry waste on-site prior to disposal, do so only in containers or tanks for less than ninety days. Do not create regulated waste piles by storing hazardous waste in piles. The ninety (90) day accumulation time exemption (35 IAC 722.134) only applies to containers and tanks.**

No additional regulated units will be created during the removal and containment of the zinc oxide. It was necessary to separate the water from the zinc oxide, store the shredded vegetation, and stockpile contaminated limestone rock by creating smaller containment areas within the larger containment. However, no new units were created during this process since the entire larger containment area will undergo closure.

5. **Prevent further releases by capping the end of the 10 inch discharge pipe. Also locate the source of the discharge and insure that there are no further releases.**

The 10 inch pipe was sealed with a 10" PVC cap approximately 50' south of where is crosses Oldenberg Road. The valve on the south side of Oldenberg Road has been shut off. The pipe and valve will be removed up to the south side of Oldenberg Road and a permanent seal installed to prevent any further releases.

6. **The June 30, 1988 consent Order filed in the Circuit Court for the Third Judicial Circuit Madison County, Illinois states that zinc oxide that is placed on the land is not exempt from the requirements of the RCRA or State special waste requirements. Since the zinc oxide slurry discharge to the impoundment is characteristically hazardous for lead and cadmium, it must be managed as a hazardous waste. The waste removed from the impoundment must be sent to a facility with a USEPA Identification Number and must be permitted to accept the waste.**

Chemetco has characterized the spilled material and determined it is zinc oxide. Chemetco agrees if the material were to be left in the spill area, i.e. disposed, it would need to be managed as a hazardous waste. However, since the material can be recycled for further metal reclamation, as is the current zinc oxide produced, the material does not meet the definition of a solid waste under 35 Ill. Adm. Code, Part 721. Specifically, 721.102(e) states materials are not solid wastes when recycled if they can be returned to the original process from which they are generated, without first being reclaimed. The spilled zinc oxide can be sold to existing customers without further reclamation. The spilled zinc oxide has been secured and contained to prevent any further releases to the environment until this issue is resolved. Chemetco acknowledges the apparent disagreement regarding the management of the zinc oxide and is willing to work with the Agency towards resolution of this issue and has initiated discussions with the Illinois Attorney General's Office regarding the 1988 Consent Order.

7. **A detailed description of the dewatering process of the zinc oxide slurry in Chemetco's on-site filter presses must be submitted to the Agency before any dewatering takes place. This plan must include but not be limited to the following:**

   a) **Identify the cells which will be dedicated to the management of hazardous waste;**

b) **Describe the flow of waste through the dewatering process;**

c) **Provide a detailed description of how Chemetco will prevent the mixing of the current generation of zinc oxide with the zinc oxide removed from the impoundment. Chemetco must not mix the hazardous waste zinc oxide removed from the impoundment with the zinc oxide generated elsewhere in the plant;**

d) **All accumulation of the zinc oxide slurry must be done in containers or tanks in compliance with 35 IAC 722.134 and 728.**

At the current time, Chemetco is not anticipating using the on-site filter presses to dewater the zinc oxide. Instead the zinc oxide, will be dewatered by adding a drying agent such as lime in the field prior to loading into trucks. If in the event, Chemetco decides to use the on-site filter presses, the information requested above by the Agency will be submitted prior to the use of the tanks and presses.

8. **The Illinois Environmental Protection Agency must be contacted at 618/346-5120 two (2) days prior to sending any waste to the on-site filter presses or associated tanks for dewatering.**

The IEPA will be contacted two days prior to conducting any dewatering and/or shipment of the zinc oxide material.

9. **The Agency must inspect each cell prior to receiving any hazardous zinc oxide waste.**

See response to Item #7 above.

I trust this information along with the Revised Work Plan addresses all of the Agency's comments raised in the September 30, 1996 letter. If you have any questions please feel free to contact me at the number below.

Sincerely,

Cindy S Davis

Cindy S. Davis
President

cc: Greg Cotter, Chemetco
George von Stamwitz, Armstrong, Teasdale, Schlafly and Davis
IEPA - Emergency Response Unit

CHEMETCO, INC.
WORK PLAN FOR THE IMMEDIATE RESPONSE TO ZINC OXIDE SPILL
Revised October 10, 1996

Prepared by:

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

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FIGURES

ATTACHMENTS

CHEMETCO, INC.
WORK PLAN FOR THE IMMEDIATE RESPONSE TO ZINC OXIDE SPILL
SEPTEMBER 25, 1996
Revised October 10, 1996

Prepared by: CSD ENVIRONMENTAL SERVICES, INC.
2220 Yale Boulevard
Springfield, IL 62703
217/522-4085
217/522-4087 (fax)

INTRODUCTION

An apparent spill of zinc oxide material was reported to the National Response Center and Illinois Emergency Management Agency on September 19, 1996. The spill was found during a routine RCRA Inspection conducted by the IEPA on September 18, 1996. Personnel from the United States Environmental Protection Agency (USEPA) were also present during the inspection. During the inspection, material that appeared to be zinc oxide was discharging from a pipe located south of Old Oldenberg Road. The IEPA and Chemetco, Inc. (Chemetco) collected samples of the water and of the sediment. Three sediment samples and one water sample were collected. Chemetco's samples were shipped to Environmental Analysis on the afternoon of September 18, 1996. Analysis was requested for total lead, cadmium, and zinc and TCLP on lead, cadmium and zinc. Sample results were received by Chemetco on September 27, 1996. Copies of the analytical results are provided as Attachment 1 to this work plan.

To ensure further releases from the pipe do not occur, a PVC plastic cap was temporarily placed over the end of the discharge pipe. The valve on the south side of Oldenberg Road has been shut off. The pipe and valve will be removed up to the south side of Oldenberg Road and a permanent seal installed to prevent any further releases.

This work plan addresses the temporary containment and removal of the apparent zinc oxide material. CSD Environmental Services, Inc. (CSD) has confirmed the release is confined to Chemetco's property. The work plan will be carried out in three phases. The first phase will focus on containment, the second phase will focus on dewatering of the area, and the final phase will be removal of the zinc oxide. A separate plan will be submitted proposing sampling locations, parameters, etc., for the closure of the incident.

PHASE I - CONTAINMENT

Initially a diversion channel was constructed to reroute the lake past the spill area. A Section 404 Permit, of the Clean Water Act (CWA), was required by the Army Corp of Engineers (Corps) to reroute the lake. A permit application was faxed to the Corps on Friday, September 20, 1996 with a request to begin construction on Saturday, September 21. The application consisted of a drawing Figure 1 showing the impacted area, the location of all proposed dams, and the diversion channel.

The following steps were conducted to achieve containment:

1. A road was constructed from the west side of the private lane to the west dam (see Figure 1 attached). This road was constructed using limestone rock. The road started at a height of about 2 feet at the private lane and gradually increased to about 5 feet at the west dam. The total length of this road was about 300 feet. Later the road was extended to intercept the south portion of the truck parking lot. This allows heavy equipment and trucks to enter the spill area without backing up. This will expedite the dewatering and removal of the zinc oxide material. This road is called the rock road/dam.

2. The north side of the rock road/dam was lined with 8 to 10 millimeter thickness polyethylene plastic to inhibit water from flowing under and reaching Long Lake. Limestone rock, was placed on top of the liner to hold it in place.

3. An earthen berm was constructed approximately 3 to 5 feet in height around the entire perimeter of the spill area. A drainage ditch was constructed to divert surface water to Long Lake around the impacted area.

4. A diversion channel 25 feet wide by 3 to 5 feet in depth was constructed to reroute water in Long Lake around the spill area.

5. Two dams were constructed on Long Lake to help in the diversion. The east dam is approximately 10 to 12 feet wide. The west dam is approximately 15 feet wide. Clean soil from the construction of the diversion channel was used to construct the dams.

PHASE II-DEWATERING

To separate the water and zinc oxide and allow heavy equipment access, two new berms within the containment area were necessary. Two containment areas were made, Containment Area #1 for storage of zinc oxide and Containment Area #2 for water. Refer to Figure 2 for the location of the containment areas. The containment areas will be inspected daily to monitor freeboard levels and erosion. Inspection records will be maintained at the facility. The smaller containment areas are constructed within the larger containment. In the event one berm of the smaller areas is breached, a larger area will contain the material.

Zinc oxide was pushed by a bulldozer into Containment Area #1 to allow construction of Area #2. Water was removed from Long Lake and the southwest corner of Containment Area #1 by excavating holes and placing a slotted 55 gallon drums in each. The purpose of the drums was to prevent solids from reaching the portable pumps used to transfer the water into Containment Area #2.

PHASE III-REMOVAL

Zinc oxide will be removed from Containment Area #3 - Long Lake first, followed by either Containment Area #1 or 2. Containment Area #4 does not contain any visible zinc oxide. Refer to Figure 2 for the location of the containment areas.

A. CONTAINMENT AREA #1

Zinc oxide will be removed by either pumping it to the southwest corner of Containment Area #1 or mixing it with a drying agent to enable excavation. A decision on the type of removal will be made based upon the moisture content of the zinc oxide material and economic and environmental considerations. The two processes are described below.

1. Slurry Method - The zinc oxide will be collected in a sump. The sump will have a screen placed over it to screen out foreign objects such as trees, roots, etc. The slurry will be handled in one of the following manners:

   a. The slurry will be placed in a tanker truck and transported to Chemetco's plant. The slurry will be directly unloaded into a tank to separate the water and zinc oxide. The slurry will be routed to a filter press for further dewatering. The decanted water will be routed to the polish pits and used for cooling tower make up water. The filter cake will be sold for further reclamation.

   b. The slurry will be pumped into a temporary tank and filter press set up at the containment area. Filter cake will be loaded into a roll off box and water will be routed back to Containment Area #2 for further handling as identified in Item a above. The filter cake will be sold for further reclamation

2. Use of a drying agent - "Code L Lime", a special type of lime used by the Illinois Department of Transportation for dewatering purposes, will be mixed with the zinc oxide to remove moisture. Once the material to passes the paint filter test it will be transported for further reclamation. An MSDS sheet for "Code L Lime" is provided as Attachment 2. A test was conducted on Friday, October 4, 1996 to determine if "Code L Lime" is an effective drying agent. Two yards of "Code L Lime" was mixed with approximately 10 yards of zinc oxide in Containment Area #2. The "Code L Lime" was proved effective in reducing the moisture in the zinc oxide.

   A field pilot test was also conducted to determine the best drying agent for reducing the leachability of lead and cadmium in zinc oxide. Further treatment of the soil, after the zinc oxide is removed, may be necessary to meet clean up objectives. The test was conducted using both lime and triple super phosphate (common fertilizer). Before beginning the test a sample (E-1), was collected of the pure zinc oxide. The first test was conducted using only lime as a drying agent. Lime and zinc oxide were mixed using a ratio of 25% lime and 75% zinc oxide. Sample (E-2) was then collected from this mixture for analyses. The second test consisted of mixing super triple phosphate with the zinc oxide and lime mixture at a ratio of 75% lime and zinc oxide to 25% triple super phosphate. A sample of the mixture (E-3) was then collected. All samples were analyzed for TCLP lead, cadmium and zinc. The samples were hand delivered to Prairie Analytical Systems in Springfield for rush analysis. Sample results showed triple super phosphate was very effective in binding the lead, cadmium and zinc. Treatment of the soil with triple super phosphate to bind the remaining metals may be an option. Sample results are provided in Attachment 3.

After all the visual zinc oxide is removed, sampling will be conducted for closure in accordance with the sampling and analysis plan discussed in Phase III - Section G.

B. CONTAINMENT AREAS 2 AND 4

Water in Containment Area #2 will be sampled to determine if it meets the existing NPDES discharge requirements. If the water meets the requirements, it will be pumped to the permitted outfall area for discharge. If the water does not meet the requirements, it will be transported to the plant for use as cooling tower make up water. After the water is removed from Containment Area #2, any visible zinc oxide will be removed and placed into Containment Area #1. Sampling will be conducted in Containment Areas 2 & 4 for closure in accordance with the sampling and analysis plan discussed in Phase III - Section G.

C. LONG LAKE - CONTAINMENT AREA #3

Before removing of the zinc oxide from Long Lake, two rock pads will be placed south of the rock road/dam to allow a trackhoe access across Long Lake. The trackhoe will remove all impacted vegetation and place it on the rock road/dam where another trackhoe will transport it to the shredder. The shredder will be located within the containment area. After the vegetation is removed and the lake is dewatered, the trackhoe will scrape the zinc oxide from Long Lake toward the rock road/dam. The trackhoe will place the zinc oxide into Containment Area #2. After all the visual zinc oxide is removed, sampling will be conducted for closure. If the sample results indicate the remaining soils are below the applicable objectives, the two rock pads will be removed. The rock forming the rock pads will be inspected and any affected rock will be washed at the decontamination pad to allow further use. The soil beneath the pads will be removed and placed into containment area #2. After all the visual zinc oxide is removed, sampling will be conducted for closure in accordance with the sampling and analysis plan discussed in Phase III - Section G.

D. VEGETATION REMOVAL

A large portion of the spill area contained dense vegetation such as trees, shrubs, and plants. The vegetation was removed and fed into a grinder. The shredded material will be stored within the containment area. We anticipate using the material to help dry the zinc oxide. If this is not possible, the material will be mixed with the soil and disposed.

E. DECONTAMINATION PROCEDURES

All equipment will be decontaminated by high pressure steam cleaning following gross removal by scraping. All decontamination will be conducted on a decontamination pad constructed at the east edge of the rock dam/road. Refer to the Figure 2 for the location of the decontamination pad. All personnel entering the contaminated area must go through decontamination before entering a clean area in accordance with the Site Health & Safety Plan. All decontamination rinse waters and solids will be collected in a sump and transported to the containment area to be handled as the waste present in those areas.

F. DISPOSAL OPTIONS

The zinc oxide recovered from Long Lake and Containment Area #2 will be handled in the same manner as Chemetco's existing zinc oxide filter cake. The zinc oxide will be sold to existing customers for further metal reclamation.

G. CLOSURE

A sampling and analysis plan will be submitted to the IEPA for review. After concurrence from the IEPA of the plan is received sampling and analyses will be conducted and the results submitted to the IEPA. At the completion of the remediation, a closure plan will be submitted to the IEPA, Bureau of Land.

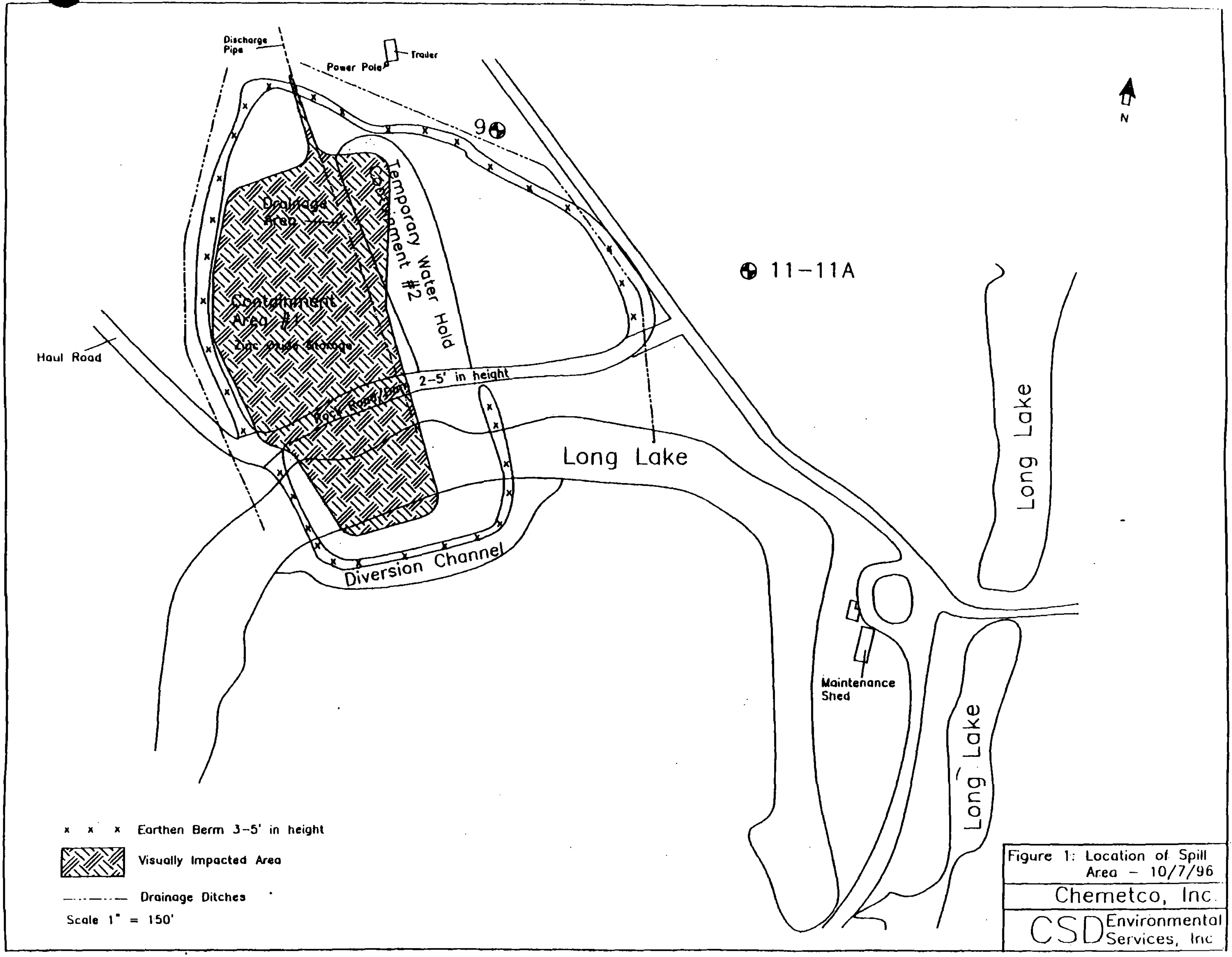
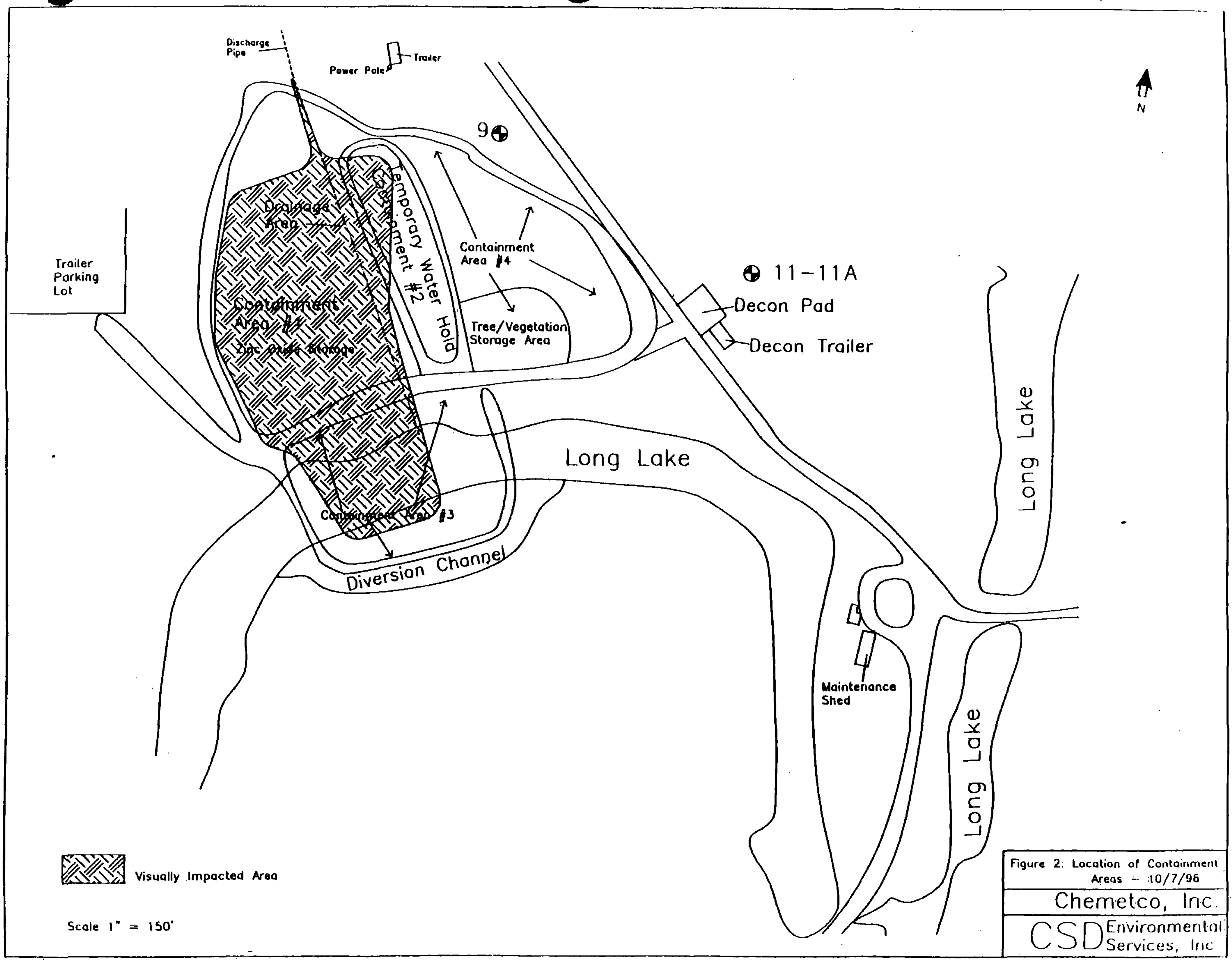


Figure 1: Location of Spill Area - 10/7/96

Chemetco, Inc.

CSD Environmental Services, Inc



Discharge Pipe
Power Pole
Trailer
Trailer Parking Lot
9
Drainage Area
Containment Area #1
Zinc Oxide Storage
Temporary Water Hold Containment #2
Containment Area #4
Tree/Vegetation Storage Area
11-11A
Decon Pad
Decon Trailer
Long Lake
Containment Area #3
Diversion Channel
Long Lake
Long Lake
Maintenance Shed
N
Visually Impacted Area
Scale 1" = 150'
Figure 2: Location of Containment Areas - 10/7/96
Chemetco, Inc.
CSD Environmental Services, Inc

ATTACHMENT 1
SAMPLE RESULTS FROM ENVIRONMENTAL ANALYSIS

TEST RESULTS REPORT
FOR CHEMETCO

LOG NUMBER	SAMPLE DESCRIPTION	RESULTS OF ANALYSIS	UNITS OF MEASURE
1815410	X101 c		
	SAMPLE DATE:09/18/96		
	TCLP Lead	428	mg Pb/l
	TCLP Cadmium	26.8	mg Cd/l
	TCLP Zinc	1740	mg Zn/l
	Total Metals Prep for solids	1	
	Lead	3.10	% w/w
	Cadmium	754	ug/g
	Zinc	6.11	% w/w
	pH Value	8.25	10% Soln
	TC Leaching Proc.	Vol.55,#61	Fed.Reg.
	Total Metals Prep/Microwave	09/25/96	
1815411	X102 c		
	SAMPLE DATE:09/18/96		
	TCLP Lead	76.2	mg Pb/l
	TCLP Cadmium	18.7	mg Cd/l
	TCLP Zinc	2920	mg Zn/l
	Total Metals Prep for solids	1	
	Lead	4.66	% w/w
	Cadmium	799	ug/g
	Zinc	8.28	% w/w
	pH Value	8.63	10% Soln
	TC Leaching Proc.	Vol.55,#61	Fed.Reg.
	Total Metals Prep/Microwave	09/25/96	
1815412	X103 c		
	SAMPLE DATE:09/18/96		
	TCLP Lead	191	mg Pb/l
	TCLP Cadmium	27.4	mg Cd/l
	TCLP Zinc	2800	mg Zn/l
	Total Metals Prep for solids	1	
	Lead	5.71	% w/w
	Cadmium	1254	ug/g
	Zinc	10.7	% w/w
	pH Value	8.85	10% Soln
	TC Leaching Proc.	Vol.55,#61	Fed.Reg.
	Total Metals Prep/Microwave	09/25/96	
1815413	S001 c		
	SAMPLE DATE:09/18/96		
	Cadmium	2.44	mg Cd/l
	Zinc	6.78	mg Zn/l
	Total Metals Prep/GTF AA	09/26/96	
	Lead	4.15	mg Pb/l
	Total Metals Prep/Microwave	09/25/96	

ATTACHMENT 2
MSDS SHEET FOR CODE L LIME

MISSISSIPPI LIME COMPANY - MATERIAL SAFETY DATA SHEET
OSHA HAZARD COMMUNICATION

PRODUCT IDENTIFICATION	CHEMICAL ABSTRACT NUMBER	DATE PREPARED
Code L	MIXTURE	05-May-95

Section I

Manufacturer	24 Hour Emergency Contact Number	HMIS RATING	
Mississippi Lime Company	(800) 437-5463	Health	3
P.O. Drawer 61	Telephone Number for information	Flammability	0
Highway 61	(800) 437-5463	Reactivity	2
Ste. Genevieve, MO 63670		Protective Equip.	E
	Signature of Preparer Mark G. DeGenova		

Section II - Hazardous Ingredients / Identity Information

Hazardous Components (Specific Chemical Identity; Common Name)		OSHA PEL	ACGIH TLV	Other Limits Recommended	% (Optional)
Calcium Oxide; Quicklime	CAS 1305-78-8	5 mg/m³	2 mg/m³		to 45 %
Calcium Hydroxide	CAS 1305-62-0	5 mg/m³	5 mg/m³		to 85 %
Crystalline Silica (Quartz)	CAS 1408-60-7	0.1 mg/m³	0.1 mg/m³		(0.1 to 0.5 %)

Code L is not listed on the NTP, IARC, or OSHA lists of carcinogens. Crystalline silica, a component of this product, is listed by IARC and NTP but not by OSHA. IARC classifies crystalline silica as "probably carcinogenic to humans" on the basis that there is limited evidence for carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals. "Limited evidence" means that a causal relationship is possible; however, other explanations such as a chance, bias or confounding factors cannot adequately be excluded. NTP also classifies crystalline silica on the basis of limited evidence as " a substance which may reasonably be anticipated to be a carcinogen" (Rev. 11/93).

Section III - Physical / Chemical Characteristics

Boiling Point (Calcium Oxide)	5162 °F	Specific Gravity (H_2O = 1)	3.00
Vapor Pressure (mm Hg)	NA	Melting Point	1076 °F
Vapor Density (Air = 1)	NA	Evaporation Rate	NA
Solubility in Water		0.2 % @ 0 °C	
Appearance and Color		Tan powder, odorless	

Section IV - Fire and Explosion Hazard Data

Flash Point	NA	Flammable Limits-	NA
Extinguishing Method	NA		
Special Fire Fighting Procedures	NA		
Unusual Fire and Explosion Hazards	NA		

Section V - Reactivity Data

Stability	Unstable		Conditions to Avoid -	NA
	Stable	X		
Incompatibility (Materials to Avoid)			Acids, Fluorine	
Hazardous Decomposition or Byproducts			None	
Hazardous Polymerization	May Occur		Conditions to Avoid -	NA
	Will Not Occur	X		

MISSISSIPPI LIME COMPANY - MATERIAL SAFETY DATA SHEET
OSHA HAZARD COMMUNICATION

PRODUCT IDENTIFICATION	CHEMICAL ABSTRACT NUMBER	DATE PREPARED
Code L	MIXTURE	05-May-95

Section VI - Health Hazard Data

Route(s) of Entry	Inhalation?	YES	Skin?	YES	Ingestion?	YES

Health Hazards	Acute	Corrosive to skin and eyes. Causes irritation and inflammation to mucous membrane and respiratory passages.
	Chronic	Long term exposure can cause irritation, ulceration and perforation of nasal septum.

Carcinogenicity	NTP?	IARC Monographs?	OSHA Regulated ?
Oxide and Hydroxide	NO	NO	NO
Crystalline Silica	YES	YES	Not as a carcinogen

Signs and Symptoms of Exposure	Irritation of skin, eyes, and respiratory tract.
Medical Conditions Generally Aggravated by Exposure	Respiratory disease, skin condition.
Emergency and First Aid Procedures	Remove to fresh air. Wash dust with soap and water. Flush out eyes with generous amounts of water. Drink plenty of water if swallowed. See Physician.

Section VII - Precautions for Safe Handling

Steps To Be Taken in Case Material is Released or Spilled	Normal clean-up procedures. Care should be taken to avoid causing dust to become airborne. Vacuum cleaning systems are recommended.
Waste Disposal Method	Dispose of in accordance with Federal, State and Local regulations.
Precautions to Be Taken in Handling	Store away from incompatible substances
Other Precautions	None

Section VIII - Control Measures

Respiratory Protection

Dust filter mask

Ventilation				
	Local Exhaust -	To Maintain TLV's and PEL's	Special -	NA
	Mechanical -	To Maintain TLV's and PEL's	Other -	NA

Protective Gloves

Leather or Rubber

Eye Protection

Well fitted goggles

Other Protective Clothing

Long sleeve shirts and pants.

Work / Hygienic Practices

Maintain dust exposure limits below TLV's and PEL's. If not possible use respiratory protection.

Section IX - Transportation

Not regulated by Department of Transportation unless product is shipped by air.

ATTACHMENT 3
SAMPLE RESULTS FROM PRAIRIE ANALYTICAL SYSTEMS, INC.

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 25 September 1996
Date Received: 26 September 1996
Date Analyzed: 27 September 1996
Date Reported: 27 September 1996

Project: Chemetco

PAS Project Code: CSD-120

Sample Description:	E-1	E-2	E-3
PAS Sample No.:	9609263995	9609263996	9609263997

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.004	26.5	21.3	2.22	6010A
Lead	0.042	195	80.1	0.20	6010A
Zinc	0.002	1083	801	49.7	6010A

Miscellaneous Analysis

Parameters	Detection Limit	Result	Result	Result	E.P.A. Method
pH (Units)	—	8.63	8.26	4.72	9045B

Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Form PAS-TCLPM

PRINTED WITH SOY INK

Chain of Custody Record

Page ___ of

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD Environmental	Project	Chemetco
Address	2220 Yale Blvd.	Contact Person	Marc Simmering
City, State, Zip	Springfield, IL 62703	P. O. #/ Invoice to:	
Phone Number	522-4085	Facsimile Number	

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling Date	Sampling Time	Container Size	Container No.	Preservative	Analysis Requested	PAS Sample Number
E-1		9/25	3:00p	4oz	1		pH, TCLP (Pb, Cd, Zn)	3995
E-2		"	3:20p	"	1		"	3996
E-3		"	3:38p	"	1		"	3997
W-1		"	4:22p	500ml	1		" total Pb, Cd, Zn	3998
							per Harry C. 9/26/96 9:05am	

Relinquished by: Shawn A. Thorpe		Received by: Sarah A Tulty	
Date: 9/26/96	Time: 9:00 am	Date: 9/26/96	Time: 9:00 am
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-120

Form PASCOC1

Copies White - Client, Yellow - Lab Receiving, Pink - Retained by Sampler

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 25 September 1996
Date Received: 26 September 1996
Date Analyzed: 27 September 1996
Date Reported: 27 September 1996

Project: Chemetco

PAS Project Code: CSD-120

Sample Description: W-1

PAS Sample No.: 9609263998

Total Metal Analysis

Analytes	Detection Limit mg/l	Result mg/l	E.P.A. Method
Cadmium, Total	0.004	1.09	6010A
Lead, Total	0.042	0.64	6010A
Zinc, Total	0.002	2.59	6010A

Miscellaneous Analysis

Parameters	Detection Limit	Result	E.P.A. Method
pH (Units)	—	8.29	9040A

Stephen R. Johnson, Laboratory Director

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Form PAS-RWMETAL

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ATTACHMENT 2

Corp of Engineers Permit

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

2200 Churchill Road, Springfield, IL 62794-9276

217/782-0610

September 24, 1996

St. Louis District
Corps of Engineers
122 Spruce Street
St. Louis, Missouri 63103

Re: Chemetco (Madison County)
Cleanup of zinc oxide
Log # C-1318-96 [CoE appl. #]

Gentlemen:

This Agency received a request on September 20, 1996 from Chemetco requesting necessary comments concerning the cleaup operations due to a zinc oxide spill in Hartford. We offer the following comments.

Based on the information included in this submittal, it is our engineering judgment that the proposed project may be completed without causing water pollution as defined in the Illinois Environmental Protection Act, provided the project is carefully planned and supervised.

These comments are directed at the effect on water quality of the construction procedures involved in the above described project and are not an approval of any discharge resulting from the completed facility, nor an approval of the design of the facility. These comments do not supplant any permit responsibilities of the applicant toward the Agency.

This Agency hereby issues certification under Section 401 of the Clean Water Act (PL 95-217), subject to the applicant's compliance with the following conditions:

1. The applicant shall not cause:

   a. violation of applicable water quality standards of the Illinois Pollution Control Board, Title 35, Subtitle C: Water Pollution Rules and Regulation;

   b. water pollution defined and prohibited by the Illinois Environmental Protection Act; or

   c. interference with water use practices near public recreation areas or water supply intakes.

2. The applicant shall provide adequate planning and supervision during the project construction period for implementing construction methods, processes and cleanup procedures necessary to prevent water pollution and control erosion.

3. Any spoil material excavated, dredged or otherwise produced must not be returned to the waterway but must be deposited in a self-contained area in compliance with all state statutes, regulations and permit requirements with no discharge to waters of the State unless a permit has been issued by this Agency. Any backfilling must be done with clean material and placed in a manner to prevent violation of applicable water quality standards.

4. All areas affected by construction shall be mulched and seeded as soon after construction as possible. The applicant shall undertake necessary measures and procedures to reduce erosion during construction. Interim measures to prevent erosion during construction shall be taken and may include the installation of staked straw bales, sedimentation basins and temporary mulching. All construction within the waterway shall be conducted during zero or low flow conditions. The applicant shall be responsible for obtaining an NPDES Storm Water Permit prior to initiating construction if the construction activity associated with the project will result in the disturbance of 5 (five) or more acres, total land area. An NPDES Storm Water Permit may be obtained by submitting a properly completed Notice of Intent (NOI) form by certified mail to the Agency's Division of Water Pollution Control, Permit Section.

5. The applicant shall implement erosion control measures consistent with the "Standards and Specifications for Soil Erosion and Sediment Control" (IEPA/WPC/87-012).

6. The channel relocation shall be constructed under dry conditions and stabilized to prevent erosion prior to the diversion of flow.

7. Clean material shall be used for the dam construction.

8. All spoil material excavated shall be disposed in accordance with 35 Ill. Adm. Code, Subtitle G. The applicant shall provide analytical results of the contaminated excavated spoil material to the Illinois EPA, Division of Land Pollution Control for approval prior to disposal.

This certification becomes effective when the Department of the Army, Corps of Engineers, includes the above condition #1 through # 8 as conditions of the requested permit issued pursuant to Section 404 of PL 95-217.

This certification does not grant immunity from any enforcement action found necessary by this Agency to meet its responsibilities in prevention, abatement, and control of water pollution.

Very truly yours,

Thomas G. McSwiggin, P. E.
Manager, Permit Section
Division of Water Pollution Control
TGM:BY:VMK:13180924.96c
cc: IEPA, Records Unit
IEPA, DWPC, FOS, Collinsville
IDNR, OWR, Springfield
USEPA, Region 5
Chemetco
CSD Environmental

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

REPLY TO
ATTENTION OF

September 21, 1996

Regulatory Branch
File No. 199610990

Chemetco
Post Office Box 67
Hartford, Illinois 62048

Gentlemen:

We have reviewed your facsimile of September 20, 1996, requesting emergency authorization to conduct remedial actions for a recent Zinc Oxide spill affecting Long Lake. The clean-up efforts would involve constructing an earthen levee, averaging 2 to 5 feet high and 10 feet wide, around the perimeter of the affected area. A five-foot-high levee with a poly liner and rock cap would be constructed within the perimeter of the earthen levee, directly adjacent to the affected portion of Long Lake, to serve as a containment area. The dammed portion of Long Lake would be dewatered and excavated to remove the presence of Zinc Oxide. This material would be pumped over the adjacent lined and rock capped levee for further remedial action. An unnamed tributary to Long Lake, flowing into the affected area, would have to be diverted around the earthen levee for an approximate 700-foot-long reach to maintain flows. In addition, an approximate 450-foot-long by 25-foot-wide by 4-foot-deep channel would be excavated to keep Long Lake connected below the dammed off portion. The subject activity site is located approximately 4 miles directly south of Hartford, near Oldenburg, in Madison County, Illinois.

We have determined that the proposed project is authorized under Section 404 of the Clean Water Act by existing Department of the Army nationwide permits as described in 33 CFR 330, Appendix A (B)(38). Enclosed is a copy of the nationwide permit, and terms and conditions (marked in red) with which you must comply.

The Illinois Environmental Protection Agency has denied water quality certification for these permits. You must obtain individual water quality certification or generic 401 certification or provide to the Corps a copy of the application to the state for the certification. If the IEPA fails to act within a reasonable period of time (60 days from the date of this letter), a waiver will be presumed. Upon receipt of water quality certification, the proposed work is authorized. If the water quality certification is conditioned by the state, these conditions will become part of the Corps permits. The District Engineer has conditioned this permit to include the following:

a. Any excess material associated with the activities of this project will not be discharged into either aquatic areas or wetland areas.

b. All excess material will be removed to upland sites and not stored or abandoned within the floodplain area.

c. The applicant shall ensure that the project not cause: (1) violation of applicable water quality standards of the Illinois Pollution Control Board, Title 35, Subtitle C: Water Pollution Rules and Regulations; (2) water pollution as defined and prohibited by the Illinois Environmental Protection Act; and (3) interference with water use practices near public recreation areas or water supply intakes.

d. All areas affected by construction shall be mulched and seeded as soon after construction as possible. The applicant shall undertake necessary measures and procedures to reduce erosion during construction. Interim measures to prevent erosion during construction shall be taken and may include the installation of staked straw bales, sedimentation basins and temporary mulching.

e. All impacted areas including, but not limited to, Long Lake, the unnamed tributary, and wetland sites will be returned to their pre-spill and pre-project conditions upon completion of the remedial actions. A restoration plan must be submitted to this office within six months from the date of this letter and all restoration activities must be completed within one year from the date of this letter.

This determination is applicable only to the permit program administered by the Corps of Engineers. It does not eliminate the need to obtain other Federal, state, or local approvals before beginning work.

You are reminded that the permit is based on submitted plans. Variations from these plans shall constitute a violation of Federal law and may result in the revocation of the permit. This verification will be valid until the nationwide permit is modified, reissued, or revoked prior to January 21, 1997. It is incumbent upon you to remain informed of changes to the nationwide permits. We will issue a public notice announcing the changes when they occur. Furthermore, if you commence, or are under contract to commence, this activity before the date the nationwide permit is modified or revoked you will complete the activity under the present terms and conditions of the nationwide permit.

If the proposed project does not satisfy all conditions as indicated, please contact Charles Frerker at (314) 331-8583 for advice or information you may need in preparing an application for an individual permit.

Sincerely,

Michael Ricketts
Corps/Rivers Project Manager

Enclosure

Copy Furnished: (w/o enclosure)

Mr. Bruce Yurdin
Illinois Environmental Protection Agency
DWPC, Permit Section, Watershed Unit
2200 Churchill Road
Springfield, Illinois 62794-9276

Mr. Robert Dalton
Illinois Department of Natural Resources
Office of Water Resources
3215 Executive Park Drive
Post Office Box 19484
Springfield, Illinois 62794-9484

Ms. Joyce Collins
U.S. Department of the Interior
Fish and Wildlife Service (ES)
Rural Route 3 , Box 328
Marion, Illinois 62959-9579

Mr. Gerald D. Winn
U.S. Environmental Protection Agency
Region V
Wetland Protection Section (5WQW-16J)
77 West Jackson Boulevard
Chicago, Illinois 60604

Ms. Anne Haaker
State Historic Preservation Office
Illinois Historic Preservation Agency
State Capitol
Springfield, Illinois 62701

Mr. Robert Schanzle
Illinois Department of Natural Resources
524 South Second Street
Springfield, Illinois 62701-1787

include a statement that the verification will remain valid for the specified period of time, if during that time period, the NWP authorization is reissued without modification or the activity complies with any subsequent modification of the NWP authorization. Furthermore, the response should include a statement that the provisions of § 330.6(b) will apply, if during that period of time, the NWP authorization expires, or is suspended or revoked, or is modified, such that the activity would no longer comply with the terms and conditions of an NWP. Finally, the response should include any known expiration date that would occur during the specified period of time. A period of time less than two years may be used if deemed appropriate.

(iii) For activities where a state has denied 401 water quality certification and/or did not agree with the Corps consistency determination for an NWP the DE's response will state that the proposed activity meets the terms and conditions for authorization under the NWP with the exception of a state 401 water quality certification and/or CZM consistency concurrence. The response will also indicate the activity is denied without prejudice and cannot be authorized until the requirements of §§ 330.4(c)(3), 330.4(c)(6), 330.4(d)(3), and 330.4(d)(6) are satisfied. The response will also indicate that work may only proceed subject to the terms and conditions of the state 401 water quality certification and/or CZM concurrence.

(iv) Once the DE has provided such verification, he must use the procedures of 33 CFR 330.5 in order to modify, suspend, or revoke the authorization.

(b) *Expiration of nationwide permits.* The Chief of Engineers will periodically review NWPs and their conditions and will decide to either modify, reissue, or revoke the permits. If an NWP is not modified or reissued within five years of its effective date, it automatically expires and becomes null and void. Activities which have commenced (i.e. are under construction) or are under contract to commence in reliance upon an NWP will remain authorized provided the activity is completed within twelve months of the date of an NWP's expiration, modification, or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 330.4(e) and 33 CFR 330.5 (c) or (d). Activities completed under the authorization of an NWP which was in effect at the time the activity was completed continue to be authorized by that NWP.

(c) *Multiple use of nationwide permits.* Two or more different NWPs can be combined to authorize a "single and complete project" as defined at 33 CFR 330.2(i). However, the same NWP cannot be used more than once for a single and complete project.

(d) *Combining nationwide permits with individual permits.* Subject to the following qualifications, portions of a larger project may proceed under the authority of the NWPs while the DE evaluates an individual permit application for other portions of the same project, but only if the portions of the project qualifying for NWP authorization would have independent utility and are able to function or meet their purpose independent of the total project. When the functioning or usefulness of a portion of the total project qualifying for an NWP is dependent on the remainder of the project, such that its construction and use would not be fully justified even if the Corps were to deny the individual permit, the NWP does not apply and all portions of the project must be evaluated as part of the individual permit process.

(1) When a portion of a larger project is authorized to proceed under an NWP, it is with the understanding that its construction will in no way prejudice the decision on the individual permit for the rest of the project. Furthermore, the individual permit documentation must include an analysis of the impacts of the entire project, including related activities authorized by NWP.

(2) NWPs do not apply, even if a portion of the project is not dependent on the rest of the project, when any portion of the project is subject to an enforcement action by the Corps or EPA.

(e) *After-the-fact authorizations.* These authorizations often play an important part in the resolution of violations. In appropriate cases where the activity complies with the terms and conditions of an NWP, the DE can elect to use the NWP for resolution of an after-the-fact permit situation following a consideration of whether the violation being resolved was knowing or intentional and other indications of the need for a penalty. For example, where an unauthorized fill meets the terms and conditions of NWP 13, the DE can consider the appropriateness of allowing the residual fill to remain, in situations where said fill would normally have been permitted under NWP 13. A knowing, intentional, willful violation should be the subject of an enforcement action leading to a penalty, rather than an after-the-fact authorization. Use of after-the-fact NWP authorization must be consistent with the terms of the Army/EPA Memorandum of Agreement on Enforcement. Copies are available from each district engineer.

Appendix A to Part 330—Nationwide Permits and Conditions

A. Index of the Nationwide Permits and Conditions

Nationwide Permits

1. Aids to Navigation
2. Structures in Artificial Canals
3. Maintenance
4. Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities
5. Scientific Measurement Devices
6. Survey Activities
7. Outfall Structures
8. Oil and Gas Structures
9. Structures in Fleeting and Anchorage Areas
10. Mooring Buoys
11. Temporary Recreational Structures
12. Utility Line Backfill and Bedding
13. Bank Stabilization
14. Road Crossing
15. U.S. Coast Guard Approved Bridges
16. Return Water From Upland Contained Disposal Areas
17. Hydropower Projects
18. Minor Discharges
19. 25 Cubic Yard Dredging
20. Oil Spill Cleanup
21. Surface Mining Activities
22. Removal of Vessels
23. Approved Categorical Exclusions
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28. Modifications of Existing Marinas
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36. Boat Ramps
37. Emergency Watershed Protection
38. Cleanup of Hazardous and Toxic Waste
39. Reserved
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Nationwide Permit Conditions

General Conditions

1. Navigation
2. Proper Maintenance
3. Erosion and Siltation Controls
4. Aquatic Life Movements
5. Equipment
6. Regional and Case-By-Case Conditions
7. Wild and Scenic Rivers
8. Tribal Rights
9. Water Quality Certification
10. Coastal Zone Management
11. Endangered Species
12. Historic Properties
13. Notification

dispersed by currents or other forces. The DE may extend the period of temporary side-casting up to 180 days, where appropriate. The area of waters of the United States that is disturbed must be limited to the minimum necessary to construct the utility line. In wetlands, the top 6" to 12" of the trench should generally be backfilled with topsoil from the trench. Excess material must be removed to upland areas immediately upon completion of construction. Any exposed slopes and streambanks must be stabilized immediately upon completion of the utility line. The utility line itself will require a Section 10 permit if in navigable waters of the United States. (See 33 CFR part 322). (section 404)

13. *Bank Stabilization.* Bank stabilization activities necessary for erosion prevention provided:

a. No material is placed in excess of the minimum needed for erosion protection;

b. The bank stabilization activity is less than 500 feet in length;

c. The activity will not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark or the high tide line;

d. No material is placed in any special aquatic site, including wetlands;

e. No material is of the type or is placed in any location or in any manner so as to impair surface water flow into or out of any wetland area;

f. No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored trees and treetops may be used in low energy areas); and,

g. The activity is part of a single and complete project.

Bank stabilization activities in excess of 500 feet in length or greater than an average of one cubic yard per running foot may be authorized if the permittee notifies the district engineer in accordance with the "Notification" general condition and the district engineer determines the activity complies with the other terms and conditions of the nationwide permit and the adverse environmental impacts are minimal both individually and cumulatively. (sections 10 and 404)

14. *Road Crossing.* Fills for roads crossing waters of the United States (including wetlands and other special aquatic sites) provided:

a. The width of the fill is limited to the minimum necessary for the actual crossing;

b. The fill placed in waters of the United States is limited to a filled area of no more than ⅓ acre. Furthermore, no more than a total of 200 linear feet of the fill for the roadway can occur in special aquatic sites, including wetlands;

c. The crossing is culverted, bridged or otherwise designed to prevent the restriction of, and to withstand, expected high flows and tidal flows, and to prevent the restriction of low flows and the movement of aquatic organisms;

d. The crossing, including all attendant features, both temporary and permanent, is part of a single and complete project for crossing of a water of the United States; and,

e. For fills in special aquatic sites, including wetlands, the permittee notifies the district engineer in accordance with the "Notification" general condition. The notification must also include a delineation of affected special aquatic sites, including wetlands.

Some road fills may be eligible for an exemption from the need for a Section 404 permit altogether (see 33 CFR 323.4). Also, where local circumstances indicate the need, district engineers will define the term "expected high flows" for the purpose of establishing applicability of this nationwide permit. (sections 10 and 404)

15. *U.S. Coast Guard Approved Bridges.* Discharges of dredged or fill material incidental to the construction of bridges across navigable waters of the United States, including cofferdams, abutments, foundation seals, piers, and temporary construction and access fills provided such discharges have been authorized by the U.S. Coast Guard as part of the bridge permit. Causeways and approach fills are not included in this nationwide permit and will require an individual or regional section 404 permit. (section 404)

16. *Return Water From Upland Contained Disposal Areas.* Return water from an upland, contained dredged material disposal area. The dredging itself requires a section 10 permit if located in navigable waters of the United States. The return water from a contained disposal area is administratively defined as a discharge of dredged material by 33 CFR 323.2(d) even though the disposal itself occurs on the upland and thus does not require a section 404 permit. This nationwide permit satisfies the technical requirement for a section 404 permit for the return water where the quality of the return water is controlled by the state through the section 401 certification procedures. (section 404)

17. *Hydropower Projects.* Discharges of dredged or fill material associated with (a) small hydropower projects at existing reservoirs where the project, which includes the fill, is licensed by the Federal Energy Regulatory Commission (FERC) under the Federal Power Act of 1920, as amended; and has a total generating capacity of not more than 5000 KW; and the permittee notifies the district engineer in accordance with the "Notification" general condition; or (b) hydropower projects for which the FERC has granted an exemption from licensing pursuant to section 408 of the Energy Security Act of 1980 (16 U.S.C. 2705 and 2708) and section 30 of the Federal Power Act, as amended; provided the permittee notifies the district engineer in accordance with the "Notification" general condition. (section 404)

18. *Minor Discharges.* Minor discharges of dredged or fill material into all waters of the United States provided:

a. The discharge does not exceed 25 cubic yards;

b. The discharge will not cause the loss of more than 1/10 acre of a special aquatic site, including wetlands. For the purposes of this nationwide permit, the acreage limitation includes the filled area plus special aquatic sites that are adversely affected by flooding and special aquatic sites that are drained so that they would no longer be a water of the United States as a result of the project;

c. If the discharge exceeds 10 cubic yards or the discharge is in a special aquatic site, including wetlands, the permittee notifies the district engineer in accordance with the "Notification" general condition. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands. (Also see 33 CFR 330.1(e)); and

d. The discharge, including all attendant features, both temporary and permanent, is part of a single and complete project and is not placed for the purpose of stream diversion. (sections 10 and 404)

19. *Minor Dredging.* Dredging of no more than 25 cubic yards below the plane of the ordinary high water mark or the mean high water mark from navigable waters of the United States as part of a single and complete project. This nationwide permit does not authorize the dredging or degradation through siltation of coral reefs, submerged aquatic vegetation, anadromous fish spawning areas, or wetlands or, the connection of canals or other artificial waterways to navigable waters of the United States (see 33 CFR 322.5(g)). (section 10)

20. *Oil Spill Cleanup.* Activities required for the containment and

activities associated with the restoration of altered and degraded non-tidal wetlands, riparian areas and creation of wetlands and riparian areas on U.S. Forest Service and Bureau of Land Management lands, Federal surplus lands (e.g., military lands proposed for disposal), Farmers Home Administration inventory properties, and Resolution Trust Corporation inventory properties that are under Federal control prior to being transferred to the private sector. Such activities include, but are not limited to: Installation and maintenance of small water control structures, dikes, and berms; backfilling of existing drainage ditches; removal of existing drainage structures; construction of small nesting islands; and other related activities. This nationwide permit applies to restoration projects that serve the purpose of restoring "natural" wetland hydrology, vegetation, and function to altered and degraded non-tidal wetlands and "natural" functions of riparian areas. For agreement rest ration and creation projects only, this nationwide permit also authorizes any future discharge of dredged or fill material associated with the reversion of the area to its prior condition and use (i.e., prior to restoration under the agreement) within five years after expiration of the limited term wetland restoration or creation agreement, even if the discharge occurs after this nationwide permit expires. The prior condition will be documented in the original agreement, and the determination of return to prior conditions will be made by the Federal agency executing the agreement. Once an area is reverted back to its prior physical condition, it will be subject to whatever the Corps regulatory requirements will be at that future date. This nationwide permit does not authorize the conversion of natural wetlands to another aquatic use, such as creation of waterfowl impoundments where a forested wetland previously existed. (sections 10 and 404)

28. *Modifications of Existing Marinas.* Reconfigurations of existing docking facilities within an authorized marina area. No dredging, additional slips or dock spaces, or expansion of any kind within waters of the United States are authorized by this nationwide permit. (section 10)

29. Reserved

30. Reserved

31. Reserved

32. *Completed Enforcement Actions.* Any structure, work or discharge of dredged or fill material undertaken in accordance with, or remaining in place in compliance with, the terms of a final Federal court decision, consent decree, or settlement agreement in an enforcement action brought by the United States under section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act of 1899. (sections 10 and 404)

33. *Temporary Construction, Access and Dewatering.* Temporary structures and discharges, including cofferdams, necessary for construction activities or access fills or dewatering of construction sites; provided the associated permanent activity was previously authorized by the Corps of Engineers or the U.S. Coast Guard, or for bridge construction activities not subject to Federal regulation. Appropriate measures must be taken to maintain near normal downstream flows and to minimize flooding. Fill must be of materials and placed in a manner that will not be eroded by expected high flows. Temporary fill must be entirely removed to upland areas following completion of the construction activity and the affected areas restored to the pre-project conditions. Cofferdams cannot be used to dewater wetlands or other aquatic areas so as to change their use. Structures left in place after cofferdams are removed require a section 10 permit if located in navigable waters of the United States. (See 33 CFR part 322). The permittee must notify the district engineer in accordance with the "Notification" general condition. The notification must also include a restoration plan of reasonable measures to avoid and minimize impacts to aquatic resources. The district engineer will add special conditions, where necessary, to ensure that adverse environmental impacts are minimal. Such conditions may include: limiting the temporary work to the minimum necessary; requiring seasonal restrictions; modifying the restoration plan; and requiring alternative construction methods (e.g. construction mats in wetlands where practicable). This nationwide permit does not authorize temporary structures or fill associated with mining activities or the construction of marina basins which have not been authorized by the Corps. (sections 10 and 404)

34. *Cranberry Production Activities:* Discharges of dredged or fill material for dikes, berms, pumps, water control structures or leveling of cranberry beds associated with expansion, enhancement, or modification activities at existing cranberry production operations provided:

a. The cumulative total acreage of disturbance per cranberry production operation, including but not limited to, filling, flooding, ditching, or clearing, does not exceed 10 acres of waters of the United States, including wetlands;

b. The permittee notifies the District Engineer in accordance with the notification procedures; and

c. The activity does not result in a net loss of wetland acreage.

This nationwide permit does not authorize any discharge of dredged or fill material related to other cranberry production activities such as warehouses, processing facilities, or parking areas. For the purposes of this nationwide permit, the cumulative total of 10 acres will be measured over the period that this nationwide permit is valid. (section 404)

35. *Maintenance Dredging of Existing Basins.* Excavation and removal of accumulated sediment for maintenance of existing marina basins, canals, and boat slips to previously authorized depths or controlling depths for ingress/egress whichever is less provided the dredged material is disposed of at an upland site and proper siltation controls are used. (section 10)

36. *Boat Ramps.* Activities required for the construction of boat ramps provided:

a. The discharge into waters of the United States does not exceed 50 cubic yards of concrete, rock, crushed stone or gravel into forms, or placement of pre-cast concrete planks or slabs. (Unsuitable material that causes unacceptable chemical pollution or is structurally unstable is not authorized);

b. The boat ramp does not exceed 20 feet in width;

c. The base material is crushed stone, gravel or other suitable material;

d. The excavation is limited to the area necessary for site preparation and all excavated material is removed to the upland; and

e. No material is placed in special aquatic sites, including wetlands.

Dredging to provide access to the boat ramp may be authorized by another NWP, regional general permit, or individual permit pursuant to section 10 if located in navigable waters of the United States. (sections 10 and 404)

37. *Emergency Watershed Protection and Rehabilitation.* Work done by or funded by the Soil Conservation Service qualifying as an "exigency" situation (requiring immediate action) under its Emergency Watershed Protection Program (7 CFR part 624) and work done or funded by the Forest Service under its Burned-Area Emergency Rehabilitation Handbook (FSH 509.13) provided the district engineer is notified in accordance with the notification general

(ii) The SHPO regarding the presence of any historic properties in the permit area that may be affected by the proposed project: and the available information, if any, provided by that agency.

(c) The standard individual permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PDN and must include all of the information required in (b) (1)-(5) of General Condition 13.

(d) In reviewing an activity under the notification procedure, the District Engineer will first determine whether the activity will result in more than minimal individual or cumulative adverse environmental effects or will be contrary to the public interest. The prospective permittee may, at his option, submit a proposed mitigation plan with the predischarge notification to expedite the process and the District Engineer will consider any optional mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed work are minimal. The District Engineer will consider any comments from Federal and State agencies concerning the proposed activity's compliance with the terms and conditions of the nationwide permits and the need for mitigation to reduce the project's adverse environmental effects to a minimal level. The district engineer will upon receipt of a notification provide immediately (e.g. facsimile transmission, overnight mail or other expeditious manner) a copy to the appropriate offices of the Fish and Wildlife Service, State natural resource or water quality agency, EPA, and, if appropriate, the National Marine Fisheries Service. With the exception of NWP 37, these agencies will then have 5 calendar days from the date the material is transmitted to telephone the District Engineer if they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 10 calendar days before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' concerns were considered. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects are minimal, he will notify the permittee and include any conditions he deems necessary. If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then he will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit: or (2) that the project is authorized under the nationwide permit subject to the applicant's submitting a mitigation proposal that would reduce the adverse effects to the minimal level. This mitigation proposal must be approved by the District Engineer prior to commencing work. If the prospective permittee elects to submit a mitigation plan, the DE will expeditiously review the proposed mitigation plan, but will not commence a second 30-day notification procedure. If the net adverse effects of the project (with the mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant informing him that the project can proceed under the terms and conditions of the nationwide permit.

(e) *Wetlands Delineations:* Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 30-day period will not start until the wetland delineation has been completed.

(f) *Mitigation:* Factors that the District Engineer will consider when determining the acceptability of appropriate and practicable mitigation include, but are not limited to:

(1) To be practicable the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of overall project purposes;

(2) To the extent appropriate, permittees should consider mitigation banking and other forms of mitigation including contributions to wetland trust funds, which contribute to the restoration, creation, replacement, enhancement, or preservation of wetlands.

Furthermore, examples of mitigation that may be appropriate and practicable include but are not limited to: reducing the size of the project: establishing buffer zones to protect aquatic resource values: and replacing the loss of aquatic resource values by creating, restoring, and enhancing similar functions and values. In addition, mitigation must address impacts and cannot be used to offset the acreage of wetland losses that would occur in order to meet the acreage limits of some of the nationwide permits (e.g. 5 acres of wetlands cannot be created to change a 6 acre loss of wetlands to a 1 acre loss; however, the 5 created acres can be used to reduce the impacts of the 6 acre loss).

Section 404 Only Conditions

In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material and must be followed in order for authorization by the nationwide permits to be valid:

1. *Water supply intakes.* No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.

2. *Shellfish production.* No discharge of dredged or fill material may occur in areas of concentrated shellfish production, unless the discharge is directly related to a shellfish harvesting activity authorized by nationwide permit 4.

3. *Suitable material.* No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, etc.) and material discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

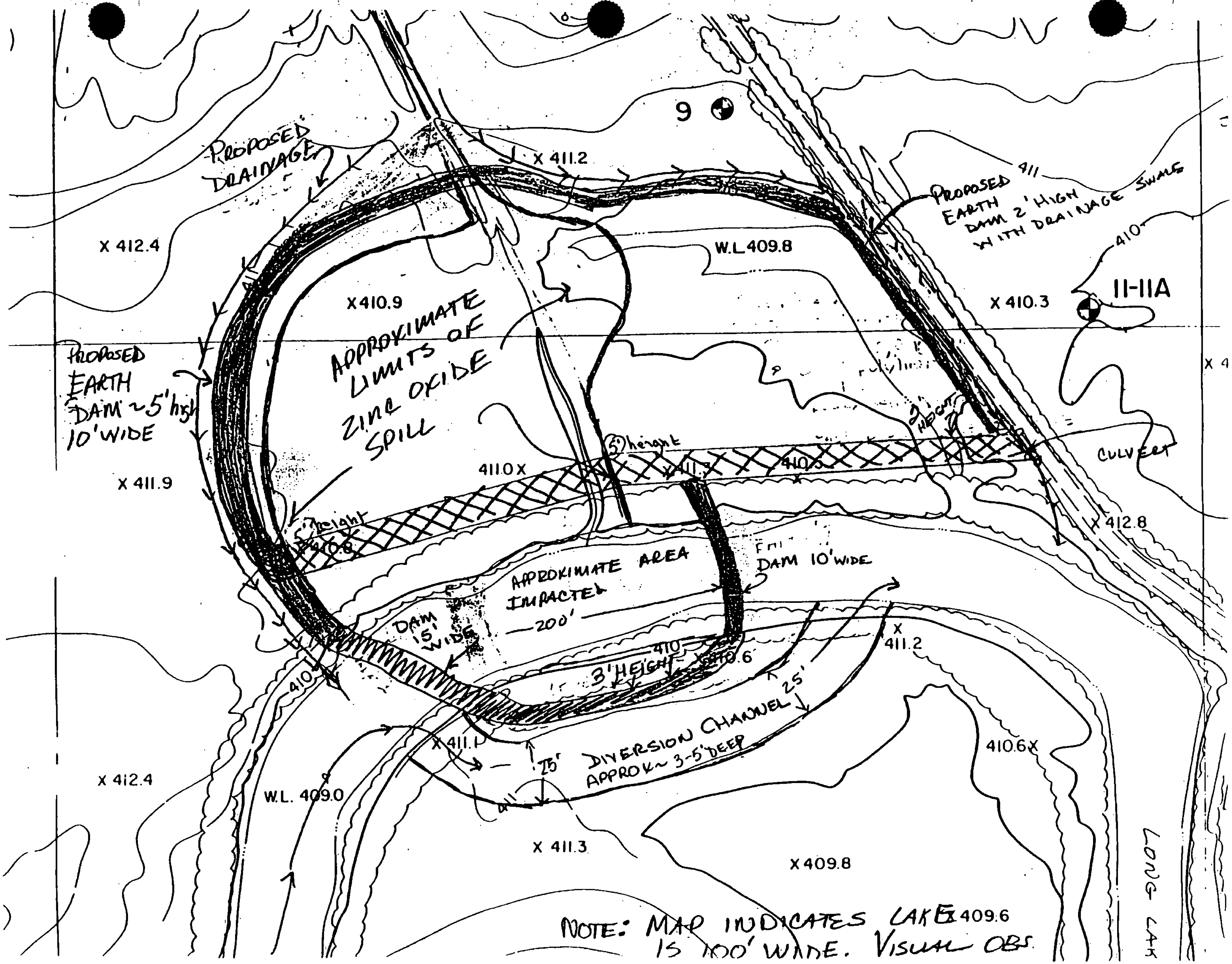
4. *Mitigation.* Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e. on-site), unless the DE has approved a compensation mitigation plan for the specific regulated activity.

5. *Spawning areas.* Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.

6. *Obstruction of high flows.* To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).

7. *Adverse impacts from impoundments.* If the discharge creates an impoundment of water, adverse impacts on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.

8. *Waterfowl breeding areas.* Discharges into breeding areas for



PROPOSED DRAINAGE
X 411.2
9
411
PROPOSED EARTH DAM 2' HIGH WITH DRAINAGE SWALE
410
X 412.4
W.L 409.8
X410.9
APPROXIMATE LIMITS OF ZINC OXIDE SPILL
X 410.3
II-IIA
PROPOSED EARTH DAM ~5' high 10' WIDE
2' HEIGHT
5' height
CULVERT
411.0 X
410
X 411.9
X 412.8
APPROXIMATE AREA IMPACTED
DAM 10' WIDE
DAM 15' WIDE
200'
410
3' HEIGHT
410.6
X 411.2
25'
DIVERSION CHANNEL APPROX ~ 3-5' DEEP
X 411.1
410.6 X
X 412.4
W.L. 409.0
X 411.3
X 409.8
NOTE: MAP INDICATES LAKE IS 100' WIDE. VISUAL OBS
X409.6
LONG LAK

7/26/90
CSC

Chemetco –
Construction Plans

1. Construct Road with 3" minus at a 2 foot height Beginning from West side of Private Lane. Grade increases to 5' height at location of drainage ditch. Height of 5' is maintained ~~for~~ approx 300' where intercepts earthen dam.

2. Line N side of Road with 2-10 mil Poly liner as a barrier to hold water. CA-6 to cover Poly liner

3. Create an earthen dam 5' high on West side of spilled area. Create drainage swale to divert surface (rain) water to Long Lake around the impacted area.

4. Construct a diversion channel 25 feet wide x 3-5 feet deep.

5. Construct 2 dams on Long Lake. East dam approx 10-12' wide. West dam 15' wide

6. Construction order
   1) Build Rock dam/road
   2) Excavate div. channel & build dam ~3' high on N side of channel.
   3) Construct 15' wide dam on west side
   4) Construct 12' wide dam on East side
   5) Finish last portion of div. channel

7/C<D

TO RELEASE WATER.

7. TO REMOVE SPILLED MATERIAL FROM LAKE ONCE DAMMED:

A. TEMPORARY EARTH PLATFORM WILL BE CONSTRUCTION TO ALLOW TRACKHOE ACCESS TO EXCAVATE. EXCAVATED MATERIAL TO BE DEPOSITED ON NORTH SIDE OF ROCK DAM/ROAD.

B. SOIL + WATER SAMPLES WILL BE COLLECTED TO DETERMINE when cleanup is finished. Clean up #'s to be ~~g~~ determined by IEPA.

TREES - DEAD Present in ~~on~~ AFFECTED PORTION OF LAKE WILL BE REMOVED.

ATTACHMENT 3

Initial Excavation Sample Results

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 09 October 1996
Date Received: 10 October 1996
Date Analyzed: 11 October 1996
Date Reported: 11 October 1996

Project: Chemetco

PAS Project Code: CSD-122

Sample Description:	Long Lake 1	Long Lake 2	Long Lake 3
Sample Number:	9610104222	9610104223	9610104224

Total Metals Analysis

Parameters	Detection Limit mg/kg	Result mg/kg	Result mg/kg	Result mg/kg	E.P.A. Method
Cadmium	0.004	56.3	8.3	16.1	6010A
Lead	0.001	27.1	75.5	333	7421
Zinc	0.002	519	498	716	6010A

TCLP Metals Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.004	<0.004	<0.004	1.3	6010A
Lead	0.042	<0.042	<0.042	10.4	6010A
Zinc	0.002	4.5	4.9	77.1	6010A

Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

PRINTED WITH SOY INK

Form PAS-RWMET3

Chain of Custody Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD Environmental Inc	Project	CHEMETCO
Address	2220 Yale	Contact Person	M. Simmering/Cindy Davis
City, State, Zip	SPFLD Il 62703	P. O. #/ Invoice to:	CSD Env. Inc.
Phone Number	522-4085	Facsimile Number	522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling Date	Sampling Time	Container Size	Container No.	Preser-vative	Analysis Requested	PAS Sample Number
LONG LAKE 1	Soil	10/9	A.M.	4oz	1	—	TOTAL + TCLP LEAD, CADMIUM, ZINC	4222
LONG LAKE 2	|	|	|	|	|	|	| | | | |	4223
LONG LAKE 3								4224
							NOTE: NEED QUICK TURN AROUND AND FAX RESULTS TO (618) 254-0138 ATT/ MARC S. + GREG COTTER THANK YOU	

Relinquished by: Marc Simmering		Received by: Sarah A Fulton	
Date: 10/9/96	Time: 3:05 P.M.	Date: 10/10/96	Time: 10:00 am
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS: Friday

PAS Project CODE: CSD-122

Form PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Sampler

ATTACHMENT 4

Sampling and Analysis Plan - Zinc Oxide Spill

FILE COPY

CHEMETCO, INC.
SAMPLING AND ANALYSIS PLAN
FOR ZINC OXIDE SPILL AREA

Prepared by:

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

October 10, 1996

CSD

Environmental Services Inc.

2220 Yale Boulevard
Springfield, IL 62703
(217) 522-4085

CHEMETCO, INC.
SAMPLING AND ANALYSIS PLAN
FOR ZINC OXIDE SPILL AREA

Prepared by:

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

October 10, 1996

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CHEMETCO, INC.
SOIL SAMPLING AND ANALYSIS PLAN
FOR ZINC OXIDE SPILL AREA

1.0 INTRODUCTION

Chemetco, Inc. (Chemetco) is a secondary copper smelter located at the intersection of Route 3 and Oldenberg Road in Hartford, IL. Chemetco was constructed in 1969 and began producing anode copper, cathode copper, crude lead-tin solder, zinc oxide and slag in 1970. The facility is located in an agricultural, light residential area south of Hartford, IL, about one mile east of the confluence of the Missouri and the Mississippi Rivers. On September 17, 1996 during a routine RCRA Inspection, the Illinois Environmental Protection Agency (IEPA) and Chemetco discovered a spill of zinc oxide material from an abandoned pipe south of Oldenberg Road. The spill was found to have entered Long Lake at the southern portion of the plant property. The spill was contained on Chemetco's property. This Sampling and Analysis Plan was compiled to determine the appropriate sampling parameters, locations and clean up objectives of the spilled zinc oxide material. A map indicating the location of the spilled zinc oxide is provided as Figure 1.

2.0 SAMPLING AND ANALYSIS

2.1 Objectives

This Sampling and Analysis Plan (SAP) describes the activities associated with determining location of, and collection method for, samples to determine the levels of lead, cadmium and zinc which are proposed to remain in the soil.

2.2 Sampling Team Responsibilities

Responsibilities of the sampling team are described below:

2.2.1 Sampling Team Leader

The sampling team leader (STL) will be responsible for conducting the sampling program, assuring the availability and maintenance of all sampling equipment and materials, and providing for shipping and packing materials. The STL will supervise and be responsible for the completion of all chain-of-custody records, proper handling and shipping of the samples collected, and the accurate completion of field log books. The STL will be present on-site whenever samples are collected.

2.2.2 Sampling Team Member(s)

The sampling team member(s) (STM) will collect samples, transfer them for shipping, and decontaminate sampling equipment as directed by the STL.

2.3 Sampling Summary

Soil samples will be collected from a grid interval and the sampling depths described in Section 3.2.

Soil samples will be analyzed using USEPA SW-846 method 9045 for pH, TCLP method 6010A for lead, cadmium and zinc. These analytical parameters were selected based on knowledge of the types of waste streams stored in these areas. The data will be evaluated in accordance with Section 5.0 of this plan.

3.0 SITE CHARACTERIZATION AND SAMPLING PROCEDURES

The following subsections present the procedures to be followed for site activities related to field surveys and sampling efforts.

3.1 Site Preparation for Soil Sampling

Prior to collecting soil samples from Long Lake, the visible zinc oxide will be removed by a trackhoe and placed into a containment area labeled area #1 for temporary storage. Refer to Figure 2 for the location of the containment areas.

Prior to collecting soil samples from containment area #1, the visible zinc oxide will be removed and sold to Chemetco's existing zinc oxide customers.

Prior to collecting soil samples from containment area #2, the water temporarily stored within will be sampled. If sample results are below the current NPDES limits, the water will be discharged under the current NPDES permit. If the results are above current NPDES limits, the water will be transported to the plant and used as cooling tower make up water.

3.2 Soil Sampling Procedures

The location of the soil sampling points are to be based upon the following equation:

$$GI = (A/\Pi)^{0.5}/2$$

where: A = area to be gridded in feet^2 , and GI = grid interval (feet)

Using the entire spill area a grid interval of 130' was derived. However, this interval resulted in only four sample locations within Long Lake. The grid interval was recalculated removing the area of Long Lake (referred to as CA-3 in the calculations) from the total area. The calculated area for containment areas 1,2, and 4 equals 161,000 feet^2, resulting in a grid interval of 113'. The area of Long Lake (containment area #3) equals 50,000 feet^2, resulting in a grid interval of 63'.

Samples will be collected where the grid lines cross. Figure 3 is a map of the approximate sample locations. The soil samples will be collected using a hand auger. Samples will be collected at two intervals, 0-6 inches and 18 - 24 inches in depth.

The soil will be sampled using the following procedures:

1. A decontaminated hand auger will be turned to the appropriate depth to obtain a representative sample;

2. The sample will be removed from the auger in the field and placed in a laboratory provided glass jar for shipping;

3. The sample jar will be immediately placed into a cooler chilled to 4 degrees Celsius; and

4. The samples will be transported to the laboratory within 24 hours of sample collection.

The hand auger will be decontaminated in accordance with the procedures discussed in Section 3.8. The any other equipment used will be decontaminated prior to and upon completion of sampling in accordance with the procedures in Section 3.8.

3.3 Analytical Program

All soil samples sent for chemical analysis will be analyzed for the group of parameters specified in Section 2.3 by Prairie Analytical Systems, Inc. located in Springfield, IL.

3.4 Sampling Methodologies

Before beginning to auger the site, the STL will become acquainted with the site features and the planned boring locations. Any movable structures will be cleared away from each location, if necessary. Equipment will be decontaminated prior to each new soil boring, following procedures included in Section 3.8.

3.5 Documentation

Sample collection will take place in the presence of a geologist. The geologist will log all borings and, at a minimum, will note the following:

- sample identification;
- date(s);
- sampling equipment used;
- sample depths;
- sample recovery;
- sample description; and
- remarks.

3.6 Sample Numbering System and Labeling

A sample numbering system will be used to allow tracking, retrieval, cross referencing of sample information and positive identification. Each sample submitted for chemical analysis will be assigned a unique sample identification number. The samples will be numbered as identified below.

1. For samples collected from containment area #1 the following number system shall be used:

   CA-1 1 - 6"
   CA-1 1 - 18"

CA-1 will identify the sample as being derived from containment area #1, with the numerical designation identifying the sample order and the depth at which the sample was collected will be provided.

2. For samples collected from containment area #2 the following number system shall be used:

   CA-2 1 - 6"
   CA-2 1 - 18"

   CA-2 will identify the sample as being derived from containment area #2, with the numerical designation identifying the sample order and the depth at which the sample was collected will be provided.

3. For samples collected from Long Lake - Containment Area #3, the following number system shall be used:

   CA-3 1 - 6"
   CA-3 1 - 18"

   CA-3 will identify the sample as being derived from Long Lake, with the numerical designation identifying the sample order and finally the depth at which the sample was collected will be provided.

4. For samples collected from containment area #4 the following number system shall be used:

   CA-4 1 - 6"
   CA-4 1 - 18"

   CA-4 will identify the sample as being derived from containment area #4, with the numerical designation identifying the sample order and the depth at which the sample was collected will be provided.

3.6.1 Labeling

Sample labels will be affixed to each sample at the time of collection. The label will include the following information as a minimum:

- Sample identification number;
- Date sampled;
- Time sampled; and
- Person sampling.

In addition, each person involved in the sampling activity will record the above information, as well as comments regarding sampling, in a field log book and on the chain of custody form.

3.7 Sample Shipment

Each sample will be placed into individual laboratory provided glass jars. Samples will be placed carefully in coolers for storage and shipment. At least two bags of ice, sealed in double plastic bags will be placed inside to maintain samples at approximately 4 degrees C. Each cooler will be provided with a chain-of-custody form. Attachment 1 illustrates a typical chain-of-custody form.

All environmental samples for analytical testing will be hand delivered or shipped overnight to Prairie Analytical within 24 hours after sampling to allow completion of analyses within the specified holding times.

3.8 Decontamination Procedures

In order to minimize the potential for cross-contamination between borings, samples and equipment which may come in contact with the sample media will be decontaminated before sampling. In addition, all equipment will be decontaminated between samples. All rinse waters used for decontamination will be captured and containerized into 55 gallon drums. The rinse waters will be transported to the polish pits or containment area #2 for disposal.

Reusable non-dedicated equipment (hand auger, split spoons, scoops, etc.) will be decontaminated between each sample and before removal from the site. The decontamination procedures for all sampling equipment will be as follows:

1. Soap wash (Alconox or equivalent) in hot water solution;
2. Potable water rinse;
3. Potable water rinse; and
4. Air Dry.

The equipment used to assist in the collection of samples will be decontaminated prior to and immediately after completion of the project. The equipment will be decontaminated using a high pressure hot water wash. A decontamination pad will be constructed of plastic sheeting and lumber. All rinse waters will be collected in a 55 gallon drum and transferred into a temporary tank by a portable pump. The rinse water will be transferred to the polish pits or containment area #2 for disposal.

3.9 Miscellaneous

3.9.1 Quality Assurance/Quality Control

Quality Assurance/Quality Control samples will include a field blank. The field equipment rinse blank sample will be collected by pouring laboratory-provided distilled/deionized water over a decontaminated split spoon or hand auger. The field blank will be analyzed for lead, cadmium and zinc.

3.9.2 Air Emissions

Chemetco will minimize air emissions during the excavation of the spilled zinc oxide by keeping the zinc oxide wet. Chemetco's water truck will spray the zinc oxide material on a daily basis to ensure dust problems do not occur.

3.9.3 Personnel Safety and Fire Prevention

Clean up operations are being conducted by personnel who have received 40 hours of health and safety training in compliance with OSHA, 29 CFR 1910.120(E). All managers and supervisors present have received an additional eight hours of specialized training on managing hazardous waste operations.

4.0 SITE INVESTIGATION REPORT

Following receipt of final analytical results, a report will be prepared summarizing the methods and results of the investigation. The report will contain information as outlined below:

- An area map will be prepared showing the general site location.
- Field and laboratory methods will be outlined and laboratory analytical results

will be reported.

- The nature and extent of any subsurface contaminants detected during the investigation will be summarized.

5.0 CLEAN UP OBJECTIVES

The data will be evaluated to determine if lead, cadmium and zinc values are above the Class II, Migration to Groundwater Values presented in TABLE A: Tier 1 Soil Remediation Objectives for Residential Properties as proposed in Title 35: Environmental Protection; Subtitle G: Waste Disposal; Chapter I: Pollution Control Board; Subchapter f: Risk Based Cleanup Objectives; Part 742 - Tiered Approach to Corrective Action Objectives. Class II numbers were chosen since the groundwater beneath the spill area is not located 10 feet or more below the ground surface as required for a Class I aquifer under 35 Ill. Adm. Code, Part 620, Section 620.210. Depth to groundwater beneath the spill area ranges from 3 to 7 feet. TABLE 1; Tier 1 Remediation Objectives are presented below:

		Route-Specific Values for Surface Soils		Migration to Groundwater Route Values		
CAS #	Chemical Name	Ingestion	Inhalation	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
7440-43-9	Cadmium[l,n]	78[b,r]	1800[e]	0.005[m]	0.05[m]	*
7439-92-1	Lead	400[b]	----[c]	0.0075[m]	0.1[m]	*
7440-66-6	Zinc	23,000[b]	----[c]	5.0[o]	10.0[o]	*

* Indicates ADL is less than or equal to the specified cleanup objective.

c No toxicity criteria available for the route of exposure.

k A preliminary remediation goal of 400 mg/kg has been set for lead based upon Revised Interim Soil Lead Guidance for CERLCA Sites and RCRA Corrective Action Facilities, OSWER Directive #9355.4-12.

l Potential for soil-plant-human exposure.

m Concentration in mg/L determined by the Toxicity Characteristic Leaching Procedure (TCLP). The person conducting the remediation has the option to use TCLP objectives listed in this Table or the applicable pH-specific soil cleanup objectives listed in Appendix, Table C or D. If the person conducting the remediation wishes to calculate soil cleanup objectives based on background concentrations, this should be done in accordance with Subpart C of 742.

n The agency reserves the right to evaluate the potential for remaining contaminant concentrations to pose significant threats to crops, livestock, or wildlife.

o For agrichemical facilities, cleanup objectives for surficial soils which are based on field application rates may be more appropriate for currently registered pesticides. Consult the Agency for further information.

If TCLP lead, cadmium and zinc values are above the Class II objectives, Chemetco retains the right to further evaluate clean up objectives using a Tier 2 or 3 evaluation, further treatment or a combination of both.

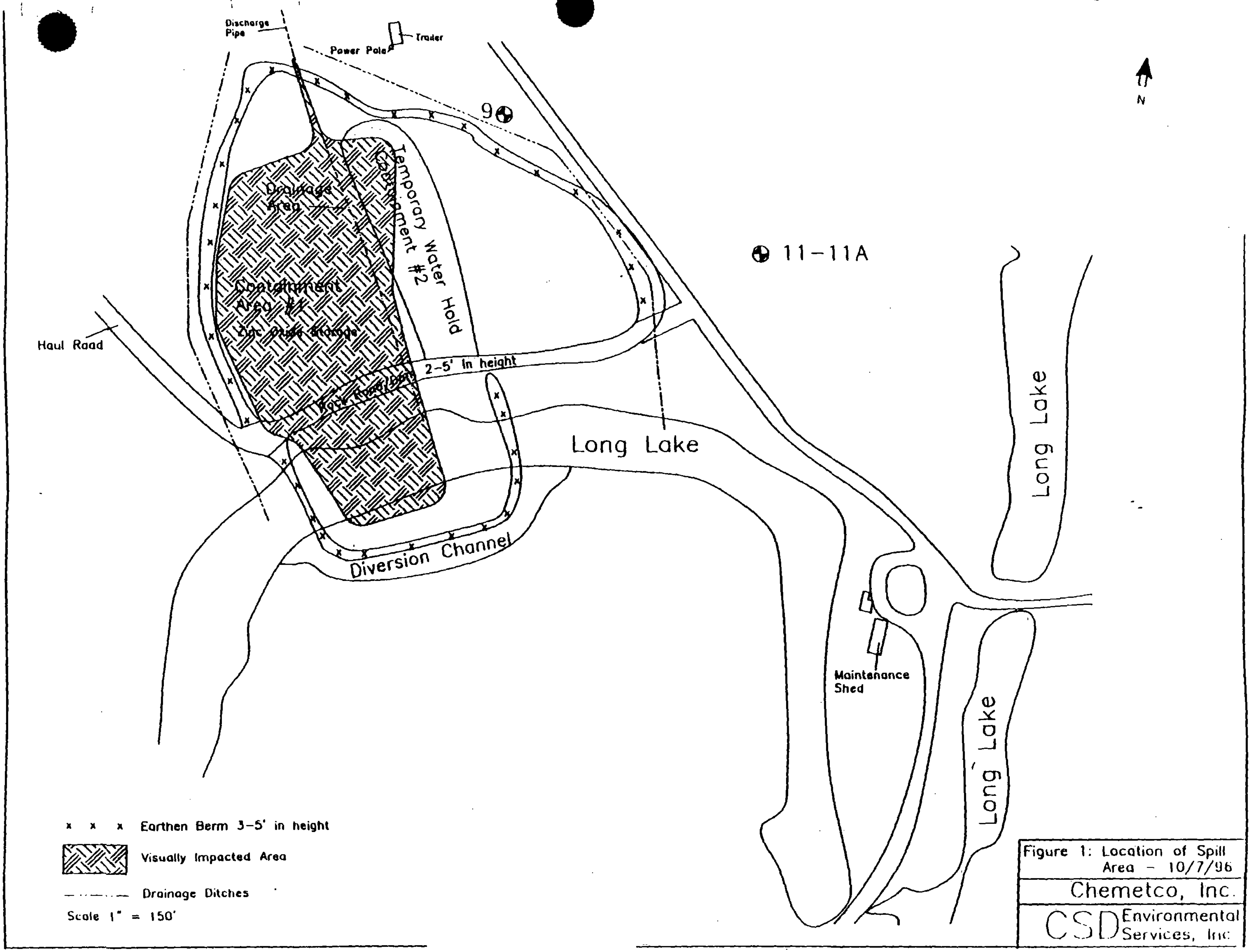

Figure 1: Location of Spill Area - 10/7/96
Chemetco, Inc.
CSD Environmental Services, Inc.

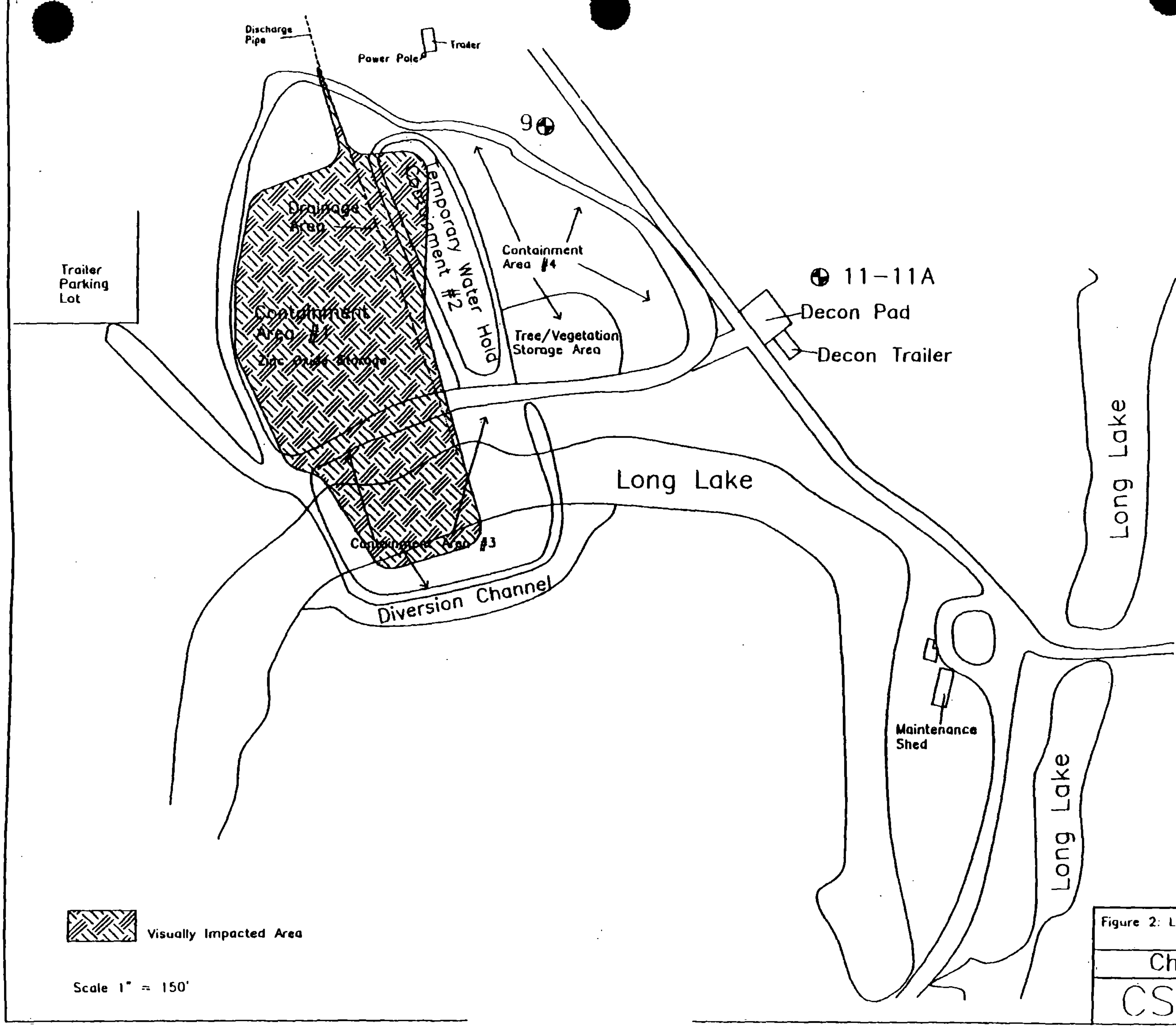

Figure 2: Location of Containme
Areas - 10/7/96

Chemetco, Inc

CSD Environment
Services, Inc

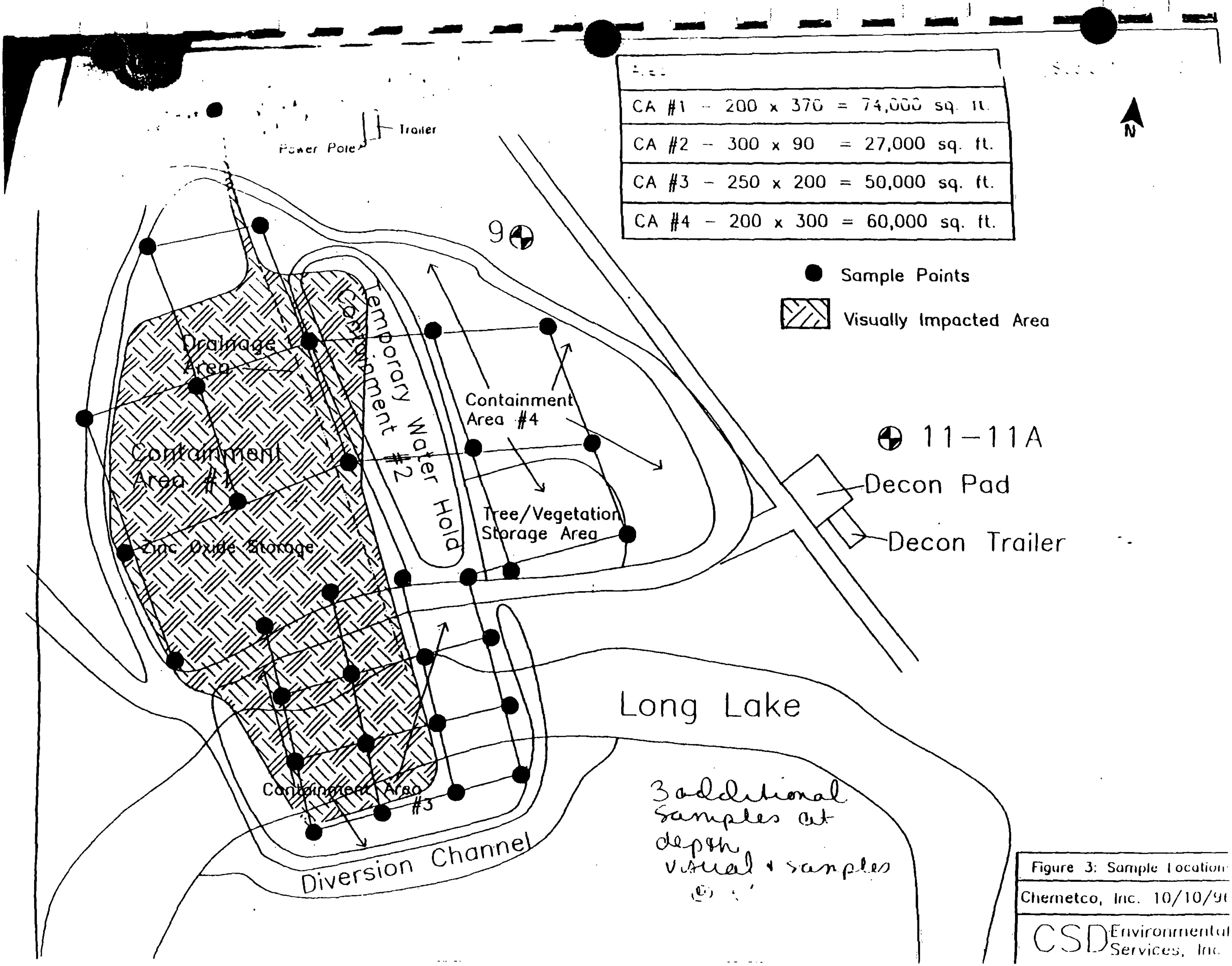

Figure 3: Sample Location

Chemetco, Inc. 10/10/96

CSD Environmental Services, Inc.

Chain of Custody Record

Page ___ of ___

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client		Project	
Address		Contact Person	
City, State, Zip		P. O. #/ Invoice to:	
Phone Number		Facsimile Number	

Sample Description (15 Characters ONLY)	Sample Matrix	Sampling		Container		Preser-vative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			

Relinquished by:		Received by:	
Date:	Time:	Date:	Time:
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: ____________

Form PASCOC1

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State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director 2200 Churchill Road, Springfield, IL 62794-9276

217/782-0610

September 24, 1996

St. Louis District
Corps of Engineers
122 Spruce Street
St. Louis, Missouri 63103

Re: Chemetco (Madison County)
Cleanup of zinc oxide
Log # C-1318-96 [CoE appl. #]

Gentlemen:

This Agency received a request on September 20, 1996 from Chemetco requesting necessary comments concerning the cleaup operations due to a zinc oxide spill in Hartford. We offer the following comments.

Based on the information included in this submittal, it is our engineering judgment that the proposed project may be completed without causing water pollution as defined in the Illinois Environmental Protection Act, provided the project is carefully planned and supervised.

These comments are directed at the effect on water quality of the construction procedures involved in the above described project and are not an approval of any discharge resulting from the completed facility, nor an approval of the design of the facility. These comments do not supplant any permit responsibilities of the applicant toward the Agency.

This Agency hereby issues certification under Section 401 of the Clean Water Act (PL 95-217), subject to the applicant's compliance with the following conditions:

1. The applicant shall not cause:

   a. violation of applicable water quality standards of the Illinois Pollution Control Board, Title 35, Subtitle C: Water Pollution Rules and Regulation;

   b. water pollution defined and prohibited by the Illinois Environmental Protection Act; or

   c. interference with water use practices near public recreation areas or water supply intakes.

2. The applicant shall provide adequate planning and supervision during the project construction period for implementing construction methods, processes and cleanup procedures necessary to prevent water pollution and control erosion.

3. Any spoil material excavated, dredged or otherwise produced must not be returned to the waterway but must be deposited in a self-contained area in compliance with all state statutes, regulations and permit requirements with no discharge to waters of the State unless a permit has been issued by this Agency. Any backfilling must be done with clean material and placed in a manner to prevent violation of applicable water quality standards.

4. All areas affected by construction shall be mulched and seeded as soon after construction as possible. The applicant shall undertake necessary measures and procedures to reduce erosion during construction. Interim measures to prevent erosion during construction shall be taken and may include the installation of staked straw bales, sedimentation basins and temporary mulching. All construction within the waterway shall be conducted during zero or low flow conditions. The applicant shall be responsible for obtaining an NPDES Storm Water Permit prior to initiating construction if the construction activity associated with the project will result in the disturbance of 5 (five) or more acres, total land area. An NPDES Storm Water Permit may be obtained by submitting a properly completed Notice of Intent (NOI) form by certified mail to the Agency's Division of Water Pollution Control, Permit Section.

5. The applicant shall implement erosion control measures consistent with the "Standards and Specifications for Soil Erosion and Sediment Control" (IEPA/WPC/87-012).

6. The channel relocation shall be constructed under dry conditions and stabilized to prevent erosion prior to the diversion of flow.

7. Clean material shall be used for the dam construction.

8. All spoil material excavated shall be disposed in accordance with 35 Ill. Adm. Code, Subtitle G. The applicant shall provide analytical results of the contaminated excavated spoil material to the Illinois EPA, Division of Land Pollution Control for approval prior to disposal.

This certification becomes effective when the Department of the Army, Corps of Engineers, includes the above condition #1 through # 8 as conditions of the requested permit issued pursuant to Section 404 of PL 95-217.

This certification does not grant immunity from any enforcement action found necessary by this Agency to meet its responsibilities in prevention, abatement, and control of water pollution.

Very truly yours,

Thomas G. McSwiggin / by [signature]

Thomas G. McSwiggin, P. E.
Manager, Permit Section
Division of Water Pollution Control

TGM:BY:VMK:13180924.96c

cc: IEPA, Records Unit
IEPA, DWPC, FOS, Collinsville
IDNR, OWR, Springfield
USEPA, Region 5
Chemetco
CSD Environmental

MEMORANDUM

Madison County - Chemetco, Inc.
Permit IL0025747
Zinc Oxide Discharge

To: Bureau of Water - FOS/RU

From: Nick Mahlandt, BOW-Collinsville

Date: September 18, 1996

Interviewed: Greg Cotter, Environmental Manager

On the above date, Chris Cahonsky, BOL, informed the writer that he had earlier been to the Chemetco facility and had found a pipe discharging a grayish colored water to a nearby drainage ditch. He asked if their NPDES covered such a discharge. He was informed that the permit is for stormwater and no point sources are covered by the permit. We agreed to visit and sample the site, and that afternoon I accompanied Mr. Cahonsky and several other BOL personnel to the Chemetco facility.

The pipe in question runs to the south, generally perpendicular to Oldenberg Road. This is between the truck parking area to the west and the road to the 002 outfall on the east. The pipe appeared to be a 10 inch line and it was discharging to a drainage ditch, which also runs in a southerly direction. From near Oldenberg Road to the outfall, the pipe run was covered with a mound of what appeared to be coal fines. This distance was approximately 125 feet. In the ditch below the outfall, several lengths of partially jointed PVC pipe were noted laid in the ditch bed. The ditch had a grayish bottom deposit, and these deposits fanned out into a low area approximately 200 feet below the outfall. The vegetation in this low area, small trees and scrub, was dead.

Mr. Cotter was asked where the flow was coming from and how long the pipe had been there. He stated that he did not know, but he would look into it.

The discharge was sampled just below the outfall, as the pipe was partially submerged, and the flow was estimated to be in the 1 to 2 gpm range. The flow was a turbid gray color and no other inflow sources were noted along the ditch. Mr. Cahnosky reported that the pipe was flowing full and was submerged during his earlier visit. The high water mark and the gray staining of the bank indicated that such a flow had occurred. My sample, and the subsequent soil samples collected by the BOL personnel, were sent by BOL to the ARDL laboratory, Mt. Vernon. Attached is a copy of the analysis results (two pages).

CSD Environmental Services, Inc.

CHEMETCO, INC.
1198010003--MADISON COUNTY
ZINC OXIDE SPILL
REMEDIATION PLAN

PHASE I - MATERIAL REMOVAL AND PARTIAL CLOSURE

PREPARED FOR:

Chemetco, Inc.
Hartford, Illinois
1198010003 – Madison County

Revised OCTOBER 1997

2220 Yale Blvd., Springfield, IL 62703 • Phone 217-522-4085 • FAX 217-522-4087

TABLE OF CONTENTS

ATTACHMENTS

FIGURES

CHEMETCO, INC.
1198010003 -- MADISON COUNTY
REMEDIATION PLAN FOR ZINC OXIDE SPILL AREA
PHASE I - MATERIAL REMOVAL AND PARTIAL CLOSURE
OCTOBER 1997

1.0 Introduction

A spill of zinc oxide was reported by Chemetco, Inc. (Chemetco) to the National Response Center and the Illinois Emergency Management Agency on September 19, 1996. The spill was found during a routine RCRA inspection conducted by the Illinois Environmental Protection Agency (IEPA) on September 18, 1996. Personnel from the United States Environmental Protection Agency (USEPA) were also present during the inspection. During the inspection, material that appeared to be zinc oxide was discharging from a pipe located south of Oldenburg Road. Sample results confirmed the spilled material was zinc oxide.

The IEPA has requested a RCRA closure plan be submitted for the spill area. In the course of negotiation, Chemetco has agreed to close the area in accordance with RCRA closure protocol. Submittal of this plan is not in any way an admission of Chemetco's behalf that the spill area is subject to RCRA requirements. The spill remediation plan will be submitted in two phases. Phase I will discuss Material Removal and Partial Demonstration of Clean Closure. Phase II will focus on Final Demonstration of "Clean Closure". This plan addresses Phase I - Material Removal and Partial Demonstration of Closure.

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NOV 17 1997
IEPA-BOL
PERMIT SECTION

2.0 Facility Description

The Chemetco facility was constructed in 1969 and commenced production of anode copper, cathode copper, crude lead-tin solder, zinc oxide and slag in 1970. The Chemetco facility is located within a primarily agricultural, light residential area south of Hartford and is bounded on the west by major, heavily traveled rail and highway routes and on the south by a limited use secondary road. More specifically, the 200+ acre plant site is in the Southeast 1/4, Section 16, Township 4 North, Range 9 West of the Third Principal Meridian, in Madison County (see Figure 2-1).

2.1 Facility Address and Identification Numbers

Chemetco, Inc.
Route 3
Hartford, IL
IEPA #1198010003
USEPA # ILD048843809

2.2 Description of Spill Area

The spill was discovered during an IEPA inspection on September 19, 1996. CSD Environmental was retained on September 20, 1996 by Chemetco to conduct remediation of the spill area. During excavation activities, layers of zinc oxide material were found to a depth of 6 feet in Long Lake indicating historical management of zinc oxide.

This remediation plan addresses source removal of zinc oxide from a spill area approximately 300 feet long by 450 feet wide. Initially the spill area was reported to be approximately 600 feet wide, however, surveying confirmed the area to be 450 feet wide. To contain the spill, four separate containment areas were constructed within the impacted area. Containment Area # 1 contains the zinc oxide removed from the other three containment areas. Containment Area #1 measures approximately 200 x 370 feet and has approximately 1,500 cubic yards of zinc oxide stored within it. Containment Area #2 measures approximately 300 x 50 feet (initially reported as 90 feet) and was constructed to temporarily hold diverted water from a portion of Long Lake. Approximately 575,000 gallons of water is estimated to be stored in Containment Area #2. Containment Area #3 measures 250 x 200 feet. Zinc oxide was removed from Containment Area #3 and was placed into Containment Area #1. Containment Area #4 measures 200 x 300 feet and was not affected by the spill to the degree that the other containment areas were. Any visible zinc oxide found in Containment Area #4 was placed into Containment Area #1. Refer to Figure 2-2 for the spill location and the containment areas.

3.0 Overview of Removal Procedures Completed

A work plan for the immediate response to the spill was submitted by CSD Environmental Services, Inc. (CSD) to the Illinois EPA on September 25, 1997. On September 30, 1997, the IEPA responded to the plan requesting additional information. A revised work plan was submitted on October 10, 1996 addressing their concerns. Attachment 1 contains a copy of the October 10, 1996 Revised Work Plan. The Work Plan addressed temporary containment and removal of the zinc oxide from Containment Area #3.

The spill area was inspected by CSD Environmental to evaluate the best options for remediation. Visual criteria was used to delineate the extent of the spill area. Initially a diversion channel was constructed to reroute the lake past the spill area. A Section 404 Permit, of the Clean Water ~~Action~~ (CWA), was received by the Army Corp of Engineers (Corp) to build a diversion channel and two dams on Long Lake. Attachment 2 contains a copy of the permit and permit application received from the Corp.

3.1 Containment

The following items were constructed to achieve containment of the spill area:

- A road was constructed using limestone rock to allow heavy equipment and trucks access to the spill area. The road was advanced over impacted soil and will be removed to enable soil remediation after the zinc oxide from Containment

Area #1 is removed. The north side of the road was lined with a 8 to 10 millimeter thickness polyethylene plastic to inhibit water from flowing under the dam. Limestone rock was placed on top of the liner to hold it in place.

- An earthen berm approximately 3 to 5 feet in height was constructed around the entire perimeter of the spill area. Surface water was diverted around the impacted area through a drainage ditch.

- A diversion channel 25 feet wide and 3 to 5 feet in depth was constructed to reroute water in Long Lake around the spill area. Two dams were constructed on Long Lake to assist in the diversion.

3.2 Dewatering

To remove the zinc oxide from Long Lake (Containment Area #3), dewatering was required. An impoundment was constructed within the contained spill area to hold water pumped from Containment Area #3. Prior to constructing the impoundment, any visual zinc oxide within the area was pushed with a bulldozer to the southwest corner of the spill area. An impoundment approximately 300 feet long by 50 feet wide was constructed. This impoundment was labeled Containment Area #2. The construction of Containment Area #2, in effect created two additional containment areas within the larger bermed area, Containment Areas #1 and 4. Containment Area #1 contained the largest percent of zinc oxide from the spill, therefore it was decided this area would be best suited to contain the zinc oxide to be removed from Long Lake. Containment Area #4 was not as significantly impacted from the spill as the other others. Containment Area #4 was used for temporarily storing vegetation removed from the spill area and rock removed from the temporary pads constructed within Long Lake to allow equipment access. The portion of Long Lake to be dewatered and remediated was labeled Containment Area #3. Refer to Figure 2-2 for the spill locations and the containment areas.

3.3 Zinc Oxide Removal from Containment Area #3 (Long Lake)

The water from Containment Area #3 was transferred to Containment Area #2 using portable trash pumps. Two pads were constructed of limestone rock on the north side of Long Lake to allow the trackhoe access to the south side of the lake. All vegetation and debris (logs) within Long Lake were removed and temporarily stockpiled within Containment Area #4 for further handling. After the vegetation was removed and the dewatering was completed, excavation of impacted soils was initiated. Visual criteria was used to determine the initial excavation depth. Visual inspection of the soil revealed the zinc oxide extended to a depth of approximately 6 feet indicating the area was impacted from historical management of zinc oxide. Three sediment samples were collected after the initial excavation to determine if additional excavation was necessary. Refer to Figure 3-1 for the location of the sediment samples. Table 1 summarizes the analytical results. Copies of the analysis are provided in Attachment 3.

The sample results confirmed the visual criteria used to determine the initial excavation depth was an excellent indicator to identify the extent of contamination. Additional excavation was conducted in the area of sample 3. The temporary pads constructed to allow access across Long Lake were removed and temporarily stockpiled in Containment Area #4.

A Sampling and Analysis Plan was submitted to the IEPA on October 10, 1996. The sampling and analysis plan identified the sample locations and sampling parameters to determine closure. The plan was verbally approved by the IEPA on October 21, 1996. Refer to Attachment 4 for a copy of the Sampling and Analysis Plan.

Photographs documenting the containment of the spill area, construction of containment area #2 and removal of the zinc oxide from Containment Area #3 (Long Lake) are provided as Attachment 5.

Table 1
Soil Samples - Long Lake - After Initial Excavation
October 9, 1997
Chemetco, Inc.

Sample Number: Parameter:	Long Lake 1	Long Lake 2	Long Lake 3
Total Metal Analysis in mg/kg			
Cadmium	56.3	8.3	16.1
Lead	27.1	75.5	333
Zinc	519	498	716
TCLP Metal Analysis in mg/l			
Cadmium	<0.004	<0.004	1.3
Lead	<0.042	<0.042	10.4
Zinc	4.5	4.9	77.1
IEPA Clean Up Objectives			
Cadmium	0.005		
Lead	0.0075		
Zinc	5.0		

Clean up objectives as proposed in Title 35: Environmental Protection: Subtitle G: Waste Disposal: Chapter I; Pollution Control Board; Subchapter F: Risk Based Cleanup Objectives; Part 742 - Tiered Approach to Corrective Action Objectives; Class I - Migration to Groundwater Route Values. Those TCLP values exceeding the objectives are highlighted. No objectives are identified for total metal values.

3.4 Vegetation Removal

To remove the zinc oxide from the impacted area, it was necessary to remove standing and fallen trees to allow equipment access to the area. The trees removed were cut with chain saws above the roots. If visible zinc oxide was detected on the tree, the cut was made above the visual point. The trees were fed through a large tub grinder for shredding. The shredded material was temporarily stockpiled in Containment Area #4 for further handling. The tree roots were removed by excavation and also placed in Containment Area #4. The tub grinder was decontaminated using a high pressure steam wash before leaving the job site. All decontamination waters were containerized in a 475 gallon polyethylene tank and transferred to Containment Area #2, pending future on-site treatment.

In August of 1997, the tree stumps, shredded wood and limestone rock were removed from containment area #4 and placed into Containment Area #1. The zinc oxide in Containment Area #2 was reworked to allow a plastic cap to be installed. Care was taken to work the zinc oxide in a wet form only. A cap of 10 - 12 millimeters in thickness will be installed over the zinc oxide in October or November of 1997. The cap is proposed to control wind dispersal and infiltration to the groundwater.

4.0 Sampling and Analysis of Containment Areas 3 and 4

Sampling of Containment Area # 3 and a partial area of Containment Area #4 was conducted on October 23, 1996. Sampling was conducted in accordance with the approved Sampling and Analysis Plan except for the following changes:

- The area of Containment #3 was measured and found to be 28,600 ft^2 instead of 50,000 ft^2 . The grid interval was changed to 50 feet to account for the decrease in the square footage.

- Sampling was conducted using a skid loader and five foot stainless steel split spoon samplers where possible. The original sampling and analysis plan indicated sampling would be conducted using a hand auger. The use of the split spoons allowed for a five foot sample to be collected at each sample location. Three split spoons were used to speed in sample collection. Each split spoon was decontaminated between samples by washing with alconox, followed by steam cleaning and finally a tap water rinse.

Sampling began with CSD Environmental and Western Environmental personnel establishing the grid interval and marking each grid node with a construction stake. Each grid node was given a sample number identifying the sample location. Numbering corresponded to the Containment Area. For example, all samples from Containment Area #3 were identified as CA-3-#. Samples from Containment Area #4 were identified as CA-4-#. Samples were collected to demonstrate closure from Containment Areas 3 and 4. Only a portion of Containment Area #4 was sampled since the remainder of the area was flooded. Samples will be collected from Containment Areas 1, 2, and the remainder of 4 when the zinc oxide and water within containment is removed. Samples were collected at depths of 6" and 18" below grade from all sample locations. In addition, at the request of the IEPA, samples from a depth of five feet were collected at three locations within Containment Area #3; CA3-3; CA3-4 and CA3-7. Figure 4-1 indicates the sample locations. The skid loader was not able to reach sample locations 6 and 9 within Containment Area #3 therefore, samples CA3-6 and CA3-9 were collected using a hand auger. The depth of the augured hole was measured with a tape measure to ensure samples were collected from the correct depths. Decontamination procedures of the hand auger were identical to those of the five foot split spoons.

Each sample was placed into laboratory provided glass jars. The jars were labeled indicating the sample location and depth, company name, and samplers initials. The jars were immediately placed into a pre-chilled cooler of approximately 4 degrees C. Each cooler was provided with a chain of custody form. The samples were hand delivered to Prairie Analytical Systems, Inc. in Springfield, Illinois by CSD personnel within 24 hours of sample collection.

All rinse waters used for decontamination were captured and containerized into a 475 gallon polyethylene tank. The rinse waters were transported to Containment Area #2 pending future on-site treatment. Refer to Section 5.2.

4.1 Establishment of Site Specific Clean Up Objectives

On June 5, 1997, the Agency's Tiered Approach to Corrective Action Objectives

(TACO) was finalized by the Illinois Pollution Control Board. TACO allows two different methods for the establishment of Tier 1 clean up objectives for metals. One method allows for pH of the soils to be considered. Additional sampling was conducted to determine site specific clean up objectives. Specifically, the pH of the soils and the concentration of total lead, cadmium and zinc in the soil was needed. On August 13, 1997, a hand auger boring (RA-1) was advanced to a depth of four feet at a location approximately forty feet north of MW-9. A soil sample was collected at this location and sent to Prairie Analytical Systems, Inc. (Prairie), in Springfield, IL, for analysis of pH. In addition to the sample collected from boring RA-1, soil samples were also collected from various locations in Containment Area #4, from beneath the rock road, and the ditch. A drill rig was used to collect the samples from beneath the rock road. Refer to Figure 4-2 for the rock road and ditch sample locations. The samples were sent to Prairie for analysis of total lead, cadmium and zinc. Analytical results are provided in Attachment 6.

On September 22, 1997 additional samples were collected from Containment Area #3 for analysis of total lead, cadmium and zinc. These samples were collected by chaining a five foot split spoon sampler to the bucket of trackhoe. The construction stakes marking the locations of the previous samples (refer to Figure 4-1) were used to determine sample locations. Samples were collected from CA3-1, CA3-2, CA3-4, CA3-5, CA3-6 and CA3-9. Locations CA3-7 and CA3-8 were not accessible to the trackhoe. The samples were sent to Prairie for analysis of total lead, cadmium and zinc. The sampling procedures discussed in Section 4.0 were followed for all samples collected. Analytical results are provided in Attachment 6.

Analysis showed the native soil in the area of the zinc oxide spill has a pH of 8.34.

Using 35 IAC Part 742, Appendix B, Table C, *pH Specific Soil Remediation Objectives for Inorganics and Ionizing Organics for the Soil Component of the Groundwater Ingestion Route (Class I Groundwater),* cleanup objectives of 430 mg/kg and 53,000 mg/kg were established for total cadmium and total zinc, respectively. Using Appendix B, Table B, *Tier 1 Soil Remediation Objectives for Industrial/Commercial Properties*, a remediation objective of 400 mg/kg was established for total lead.

4.2 Analytical Results - Containment Area #3

Tables 2 and 3 summarize the TCLP and total sample results collected from Containment Area 3. The sample results from Containment Area #3 indicate the clean up objectives have been met and no soil remaining in Containment Area #3 exhibits a hazardous characteristic. Samples for total lead, cadmium and zinc were not collected from locations CA3-7 and CA3-8 due to limited access. However, analyses of the twenty one samples collected from Containment Area #3 indicate the soils remaining are far below the applicable clean up objectives. Copies of the analytical results are provided in Attachment 6. *CSD, on behalf of Chemetco requests closure of Containment Area #3 from the IEPA.*

Table 2
TCLP Soil Sample Results
Containment Area #3
Chemetco, Inc.
October 24, 1996

Sample Number	Cadmium mg/l	Lead mg/l	Zinc mg/l
Reguatory Limit- 721.124	1.0	5.0	NA
CA3-1-6"	0.013	0.012	<0.002
CA3-1-18"	<0.001	<0.001	<0.002
CA3-2-6"	<0.001	<0.001	<0.002
CA3-2-18"	<0.001	<0.001	<0.002
CA3-3-6"	0.005	<0.001	0.04
CA3-3-18"	0.007	<0.001	<0.002
CA3-3-5'	0.020	<0.001	<0.002
CA3-4-6"	0.007	<0.001	<0.002
CA3-4-18"	0.005	<0.001	<0.002
CA3-4-26"	0.008	<0.001	<0.002
CA3-4-5'	0.007	<0.001	<0.002
CA3-5-6"	0.010	<0.001	<0.002
CA3-5-18"	0.006	<0.001	<0.002
CA3-6-6"	0.066	<0.001	<0.002
CA3-6-18"	0.061	<0.001	<0.002
CA3-7-6"	0.48	<0.001	8.1
CA3-7-18"	0.009	<0.001	0.21
CA3-7-5'	0.106	<0.001	1.32
CA3-8-6"	0.010	<0.001	<0.002
CA3-8-18"	0.010	<0.001	0.24
CA3-9-6"	0.029	<0.001	0.70
CA3-9-18"	0.047	<0.001	<0.002

Table 3
Total Soil Sample Results
Containment Area #3
Chemetco, Inc.
September 22, 1997

Sample Number	Cadmium mg/kg	Lead mg/kg	Zinc mg/kg
Remediation Obj.	430[1]	400[2]	53,000[1]
CA3-1 6"	0.9	11	43
CA3-1 18"	2	11	30
CA3-1 4'	2	11	29
CA3-2 6"	2	13	33
CA3-2 18"	2	10	33
CA3-2 5'	1	7	23
CA3-3 6"	2	16	42
CA3-3 18"	1	12	43
CA3-3 5'	1	11	43
CA3-4 6"	1	8	32
CA3-4 18"	2	6	28
CA3-4 5'	1	9	35
CA3-5 6"	3	7	33
CA3-5 18"	3	10	38
CA3-5 5'	1	<2	20
CA3-6 6"	1	10	68
CA3-6 18"	1	59	89
CA3-6 3.5'*	0.5	7	21
CA3-9 6"	2	10	26
CA3-9 18"	3	9	44
CA3-9 5'	0.6	<2	14

[1]Objective established using 35 IAC Part 742, Appendix B, Table C - pH Specific Soil Remediation Objectives for Inorganics for the Soil Component of the Groundwater Ingestion Route (Class I). [2]A preliminary remediation goal of 400 mg/kg has been set for lead based on *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities*, OSWER Directive #9355.4-12. * Split spoons did not retain full five foot sample.

4.3 Analytical Results - Containment Area #4

Tables 4 and 5 summarize the TCLP and total sample results collected from Containment Area #4. Comparison of the soil sample results from Containment Area #4 with the cleanup objectives being proposed, indicates that no further remediation is required in the areas from which these samples were collected. Analytical results are provided in Attachment 6. *CSD, on behalf of Chemetco, is requesting that closure of this portion of the spill area be granted.*

Table 4
TCLP Soil Sample Results (mg/l)
Containment Area #4
Chemetco, Inc.
October 24, 1996

Sample Number	Cadmium mg/l	Lead mg/l	Zinc mg/l
Regulatory Limit from 721.124	1	5	NA
CA4-1-6"	0.018	<0.001	<0.002
CA4-1-18"	<0.001	<0.001	<0.002
CA4-2-6"	0.048	<0.001	<0.002
CA4-2-18"	0.014	<0.001	0.53
CA4-3-6"	<0.001	<0.001	<0.002
CA4-3-18"	0.005	<0.001	<0.002
CA4-4-6"	0.053	0.472	0.16
CA4-4-18"	0.107	0.047	11.7
CA4-5-6"	<0.001	<0.001	3.97
CA4-5-18"	0.032	<0.001	<0.002
CA4-9-6"	0.014	<0.001	<0.002
CA4-9-18"	<0.001	<0.001	<0.002

Table 5
Total Soil Sample Results (mg/kg)
Containment Area #4
Chemetco, Inc.
August 13, 1997

Location/Parameter	Total Cd	Total Pb	Total Zn
Remediation Obj.	430[1]	400[2]	53,000[1]
CA4-1 (6")	2	41	131
CA4-1 (18")	.6	12	56
CA4-2 (6")	5	37	139
CA4-2 (18")	.7	13	41
CA4-3 (6")	10	74	224
CA4-3 (18")	2	17	52
CA4-4 (6")	2	71	207
CA4-4 (18")	1	23	70
CA4-5 (6")	.6	14	57
CA4-5 (18")	1	15	49
CA4-9 (6")	1	28	92
CA4-9 (18")	1	13	57
B-1 (6")	19	217	579
B-1 (18")	6	80	184
B-1 (5')	1	13	49

B-1 samples were collected from the berm of Containment Area #2.

4.4 Analytical Results - Rock Road

To determine the extent of impacted soil beneath the Rock Road, a drill rig was used to advance seven samples below the rock. Refer to Figure 4-2 for sample locations. Samples were collected at three depths, 6", 18" and 5'. All samples were labelled RR- # and were collected in accordance with the procedures discussed in Section 4.0. The samples were analyzed for total lead, cadmium and zinc. A composite sample was collected for TCLP lead and cadmium. Table 6 summarizes the samples collected from beneath the rock road. The results indicate additional remediation is required in the areas of sample number seven (7). Sample results are available in Attachment 6.

Table 6
Total Soil Sample Results
Rock Road
Chemetco, Inc.
August 14, 1997

Location/Parameter	Total Cd	Total Pb	Total Zn
Remediation Obj.	430[1]	400[2]	53,000[1]
RR-1 6"	<0.2	13	55
RR-1 18"	0.6	13	47
RR-1 5'	<0.2	14	52
RR-2 6"	<0.2	15	62
RR-2 18"	<0.2	13	48
RR-2 5'	<0.2	17	50
RR-3 6"	<0.2	17	51
RR-3 18"	<0.2	14	47
RR-3 5'	<0.2	13	53
RR-4 6"	0.2	18	56
RR-4 18"	<0.2	17	43
RR-4 5'	0.8	18	45
RR-5 6"	0.8	23	49
RR-5 18"	1	16	47
RR-5 5'	<0.2	18	49
RR-6 6"	1	23	73
RR-6 18"	1	28	54
RR-7 6"	629	32507	33709
RR-7 18"	25	899	1772
RR-7 5'	1	34	64
Composite 6" (TCLP) mg/l	<0.04	<0.004	0.03
Composite 18" (TCLP) mg/l	<0.04	<0.004	<0.002
Composite 5' (TCLP) mg/l	<0.04	<0.004	<0.002

4.5 - Analytical Results - Ditch

Three soil samples were collected to determine the amount of soil excavation required in the ditch associated with the 10" pipe. Samples were labelled D-# and were collected at three depths, 6", 18" and 5'. Refer to Figure 4-2 for the sample locations. All samples were collected in accordance with the procedures discussed in Section 4.0. The samples were analyzed for TCLP and total lead, cadmium and zinc. Tables 7 and 8 summarize the samples collected. The results indicate additional remediation is required in the areas of sample numbers D-2 and D-3. Sample results are available in Attachment 6.

Table 7
Total Soil Sample Results (mg/kg)
Ditch
Chemetco, Inc.
September 8, 1997

Location/Parameter	Total Cd	Total Pb	Total Zn
Remediation Obj.	430[1]	400[2]	53,000[1]
D-1 6"	3.1	132	346
D-1 18"	9.2	1926	19699
D-1 5'	<0.2	3.1	151
D-2 6"	161	13905	23431
D-2 18"	0.23	4.5	85
D-2 5'	0.48	7.3	48
D-3 6"	209	9740	2376
D-3 18"	105	1118	2.5
D-3 5'	0.8	2.5	62

Table 8
TCLP Soil Sample Results (mg/l)
Ditch
Chemetco, Inc.
September 8, 1997

Sample Number	Cadmium mg/l	Lead mg/l	Zinc mg/l
Regulatory Limit from 721.124	1	5	NA
D-1 6"	0.04	<0.04	3.5
D-1 18"	0.07	2.4	6.5
D-1 5'	<0.004	<0.04	0.08
D-2 6"	2.5	93	44
D-2 18"	<0.004	0.13	0.25
D-2 5'	<0.2	0.13	0.70
D-3 6"	3.5	96	44
D-3 18"	0.023	0.07	1.8
D-3 5'	0.012	0.07	0.26

Samples above the regulatory limit are highlighted.

5.0 Remediation

5.1 Containment Area #1

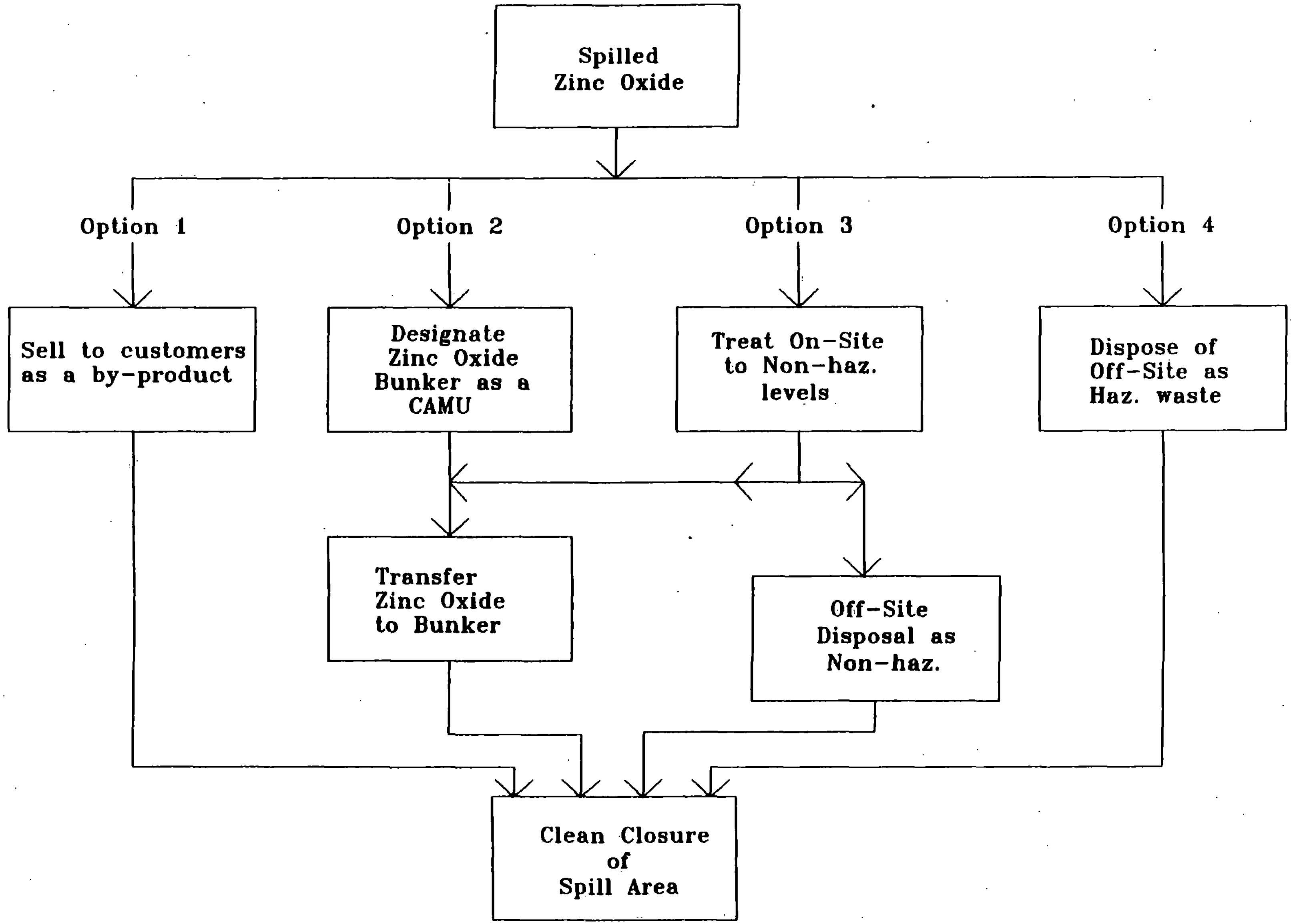
Chemetco intends to remove all the zinc oxide stored within Containment Area #1. Three options for handling the zinc oxide are discussed below and provided in Flowchart 5.1.

5.1.A. Removal Options - Zinc Oxide

5.1.A.1. Option 1 - Sale of Zinc Oxide to ELMET

Option 1: Sale of the zinc oxide to ELMET. The zinc oxide contained in Containment Area #1 (CA#-1) is a recyclable material due to level of lead, zinc, copper and precious metals contained within. Chemetco currently ships zinc oxide as a by-product to ELMET in Berango Spain for further metal recovery. Chemetco is negotiating with additional customers for the sale of zinc oxide material. Samples were collected of the zinc oxide to ensure the material will meet ELMET's specifications. A sampling grid consisting of 35 feet in the east - west direction and 40 feet in the north- south location was arranged. The south portion of the zinc oxide was estimated to be approximately 6 feet higher than the north portion, therefore, samples from the south side of CA#1 were collected at each grid interval from depths of 2, 4, and 8 feet. Samples were collected at a depth of 2 and 4 feet from the north portion. Refer to Figure 5-1 for sample locations.

Flowchart 5.1.A: Zinc Oxide Options



The samples were collected using a hand auger. Sample depth markings were placed on the extensions of the hand auger to ensure correct sampling depths. The samples were placed in one quart ziploc bags and delivered to MIDCO labs in St. Louis, MO for metal assaying. The assay results dictate the amount of copper/tin oxides required to be blended with the zinc oxide. The assay results will be sent to ELMET for pre-acceptance. If any of the samples are denied by ELMET, the zinc oxide from the corresponding sample location will be handled pursuant to option 2 described below.

If the material is found to be acceptable to ELMET, the zinc oxide will loaded into trucks and transported to the Hartford Terminal for loading into barges for shipment to New Orleans, LA. The zinc oxide will be transferred to a ship in New Orleans for shipment to ELMET in Spain. Chemetco currently has a contract with ELMET to ship up to 3,000 tons of oxides per month. Enclosed as Attachment 7 is a copy of the contract between ELMET and Chemetco.

5.1.A.2 Option 2 - Placement into the Zinc Oxide Bunker

Option 2: To facilitate a rapid and cost effective site remediation, Chemetco requests the IEPA designate the zinc oxide bunker as a Corrective Action Management Unit (CAMU). Creation of a CAMU will allow Chemetco to place the spilled zinc oxide into the bunker without triggering land disposal restrictions or minimum technology requirements. If the Agency agrees to the CAMU approach, Chemetco will include in the Part B Permit a request for CAMU designation. The closure plan and closure cost estimate will be revised to reflect the addition of the material.

The material will be loaded into trucks, tarped and transported to the southwest corner of the zinc oxide bunker. The material will either be placed on the pile by either conveyer, crane or a haul road constructed. If it is necessary to unload the material from the trucks a containment area will be constructed. Care will be taken to ensure no RCRA regulated units are created during the transferring of material. Prior to placing the zinc oxide in the bunker, polyethylene sheeting will be placed over the existing zinc oxide in the bunker for segregation. It is estimated between 1,500 to 3,000 cubic yards of zinc oxide and contaminated stumps, wood, and limestone rock will be added to the bunker. Refer to Figure 5-2 for the placement location within the bunker. Chunky slag will be placed over the zinc oxide for wind protection. The fugitive dust plan will be revised to include the addition of material to the bunker. Chemetco proposes creation of a CAMU to 1) facilitate a reliable, effective and cost effective remedy; 2) to allow remediation activities associated with the spill to move forward; and 3) protect human health and the environment.

5.1.A.3. Option 3 - Off Site Disposal

Option 3: Ship the material as a hazardous waste for treatment or to a hazardous waste disposal facility.

Chemetco proposes to pursue Option 1, sale of the material as a by-product for further metal recovery. If the IEPA does not concur with Chemetco's interpretation that the zinc oxide material is a "saleable product", Chemetco proposes to proceed with Option 2 creation of the zinc oxide bunker into a CAMU.

5.1.B Removal Procedures Containment Area 1

Prior to removal of any zinc oxide, the water in Containment Area #1 will be pumped into Containment Area #2 to initiate the drying process. No removal can occur until the water currently stored within Containment Area #2 is removed to allow room for the additional water from Containment Area #1. See Section 5.2 regarding water removal from Containment Area #2.

5.1.B.1. - Zinc Oxide Loading

The fugitive dust plan will be amended to include loading of the zinc oxide material. The zinc oxide will be loaded "as is" into polyethylene lined trucks, covered and transported. If it is determined the zinc oxide is to wet to place into the trucks, the zinc oxide will be spread out in Containment Area #1 to allow natural drying of the material. Care will be taken to ensure the material is not over dried to become an air emission source.

5.1.B.2 - Contaminated Stumps, Wood, and Limestone Rock

Contaminated stumps, wood, and limestone rock is stored in Containment Area #1. Composite samples were collected of the soil held in the roots, shredded wood and limestone rock. The samples were sent to Prairie Analytical for analysis of TCLP lead, cadmium and zinc. The results indicated the roots, shredded wood, and limestone rock failed the TCLP test for lead and cadmium. Refer to Attachment 9 for a copy of the analytical results.

Chemetco proposes to dispose of the stumps, wood, and limestone rock as a hazardous waste if the Agency agrees to allow Chemetco to pursue Option 1 sale of the zinc oxide. If the Agency denies Option 1, then Chemetco proposes to place the contaminated stumps, wood, and limestone rock in the zinc oxide bunker designated as a CAMU.

5.2 *Containment Area #2*

Containment Area #2 measures approximately 300 x 90 feet and was constructed to temporarily hold water from the diverted portion of Long Lake. Prior to constructing the impoundment, any visual zinc oxide within the area was pushed with a bulldozer to the southwest corner of the spill area. Approximately 575,000 gallons of water is estimated to be stored in Containment Area #2. A sample of the water contained within Containment Area #2 was collected on October 11, 1996 and analyzed for Chemetco's NPDES discharge parameters pursuant to Chemetco's NPDES Permit #IL0025747. Table 4 summarizes the analytical results. Exceedences of the General Use Standards were found for Cadmium, Copper, Iron, Manganese, Lead, Suspended Solids and Zinc. CSD verbally requested approval from the IEPA, Bureau of Water, on October 21,1996 for an emergency discharge of the water within Containment Area #2 to Long Lake. This request was denied by the IEPA, Bureau of Water on October 26, 1997. In response to the denial, CSD collected an additional sample of water from Containment Area #2 and analyzed for dissolved cadmium, copper, iron, lead, manganese and zinc. Sample results indicated after filtration cadmium, manganese and total suspended solids exceeded the general use standards. The sample results are provided in Table 5. On November 27, 1996, CSD submitted a letter requesting the Agency's assistant in discussing disposal options for the impounded water. The IEPA responded by letter on December 6, 1997 denying a provisional variance request for discharge of the water. In response to the IEPA's variance denial, a formal request for a variance to discharge the water after treatment was requested by Chemetco on March 20, 1997. A copy of CSD's November 27, 1996 letter, the IEPA response, and Chemetco's March 20, 1997 request for a variance is provided as Attachment 8. The IEPA denied the request for a provisional variance on March 31, 1997. A meeting was held with the Bureau of Water on April 9, 1997 to discuss the variance denial. The Bureau of Water requested CSD submit an NPDES application to discharge the water. CSD explained that due to time constraints we were requesting the variance to discharge the water. CSD informed the Bureau that CA#2 needed to be dewatered in order to begin zinc oxide removal in CA#1. The Bureau again refused the variance request. In response to the variance denial, an application for an NPDES permit and a construction permit to temporarily discharge the impounded water was submitted to the IEPA on April 16, 1997. The NPDES application was granted, however the construction permit was denied. The temporary treatment plant could not treat the water to the discharge limitation imposed by the NPDES permit for discharge to Long Lake.

CSD will request the Bureau of Water allow the water to be transferred to the permanent storm water retention basin for treatment. Chemetco submitted an NPDES permit application to construct and operate a permanent storm water treatment system with discharge to Long Lake on August 4, 1997. This application will be revised in October 1997 to request construction of the retention basin to the adjacent field north of Chemetco's plant and discharge to the Cahokia Diversion Channel. Discharge into the Cahokia Diversion Channel will allow the IEPA to establish higher discharge limits than those established in the NPDES permit for outfall 003.

5.2.A. Containment Area #2 Berms

The berms will be sampled in accordance with the procedures outlined in Section 4. Samples will be collected for TCLP and total pH, zinc, and cadmium of a 50 foot grid. Sample results will dictate if additional remediation is required. If the samples fail the TCLP test , the soil will either be 1) placed in the bunker designated as a CAMU; or disposed of as a hazardous waste. If the soils pass the TCLP test, but are above the site specific remediation objectives, the soil will be disposed of as non hazardous waste.

Table 4
Water Sample Result from Containment Area #2
Collected on October 11, 1996
Analyzed for NPDES Discharge Parameters
Total Metals

Parameter	Result in mg/l	General Discharge Standard
Silver	0.021	0.1
Boron	5.54	*
BOD	<7.5	30
Cadmium	0.563	0.15
Chlorine	<0.05	*
Copper	1.20	0.5
Iron	2.57	2.0
Hexane soluble Oil and Grease	11.5	15.0
Manganese	2.42	1.0
Nickel	0.14	1.0
Lead	1.59	0.2
Suspended Solids	67	15.0
Zinc	8.63	1.0

Those samples exceeding the General Use Standard as defined in 35 Ill. Adm. Code, Subtitle C, Part 304 are highlighted. * No standard has been established in 35 Ill. Adm. Code, Subtitle C, Section 304.

Table 5
Water Sample Result from Containment Area #2
Collected on October 28, 1996
Analyzed for NPDES Discharge Parameters
Dissolved Metal Analysis

Parameter	Result in mg/l	General Use Standard
Cadmium, diss	0.22	0.15
Copper, diss	0.136	0.5
Iron, diss	<0.007	2.0
Lead, diss	0.010	0.2
Manganese, diss	2.14	1.0
Zinc, diss	0.68	1.0
Total Suspended Solids	23	15
pH	8.53	6-9

5.3 Removal Procedures Containment Area #4

All visible zinc oxide was removed from Containment Area #4 and placed into Containment Area #1 at the time of construction of Containment Area #2. Tree stumps, shredded trees and rock were temporarily stored in Containment Area #4. The stumps, wood, and limestone rock were moved in August 1997 into Containment Area #1.

5.4 Removal Procedures for the Ditch

The vegetation in the ditch was removed in August of 1997. All vegetation was placed into Containment Area #1. Soil samples were collected for total and TCLP lead and cadmium. Refer to Section 4.5 for a discussion of the sample results. The results indicated additional excavation in the area of samples D-2 and D-3 is needed. Specifically, excavation from 0 to 18 inches is required in the area of sample D-2 and 0 to 5 feet in the area of sample D-3. Refer to Figure 5-3 for the additional area to be excavated. It is estimated an additional 106 cubic yards of impacted soil will be excavated. The soil removed will be placed into Containment Area #1 and handled pursuant to the zinc oxide options provided in Section 5.1.A.

5.5 Rock Road and Decontamination Pad

Analytical results indicated additional excavation in the area of samples RR-7 is needed. Specifically, excavation from 0 to 18 inches is required in the area of sample

RR-7. Refer to Figure 5-4 for the additional area to be excavated. It is estimated an additional 37 cubic yards of impacted soil will be excavated. The soil removed will be placed into Containment Area #1 and handled pursuant to the zinc oxide options provided in Section 5.1.A.

6.0 Proposed Sampling and Analysis to Demonstrate Clean Closure

Sampling and analysis of Containment Areas #1, 2, the remainder of 4 and the ditch will be conducted as described in Sections 6.1, 6.2, and 6.3 below. Phase II of the Remediation Plan - Demonstration of Clean Closure will be submitted within 90 days after all sampling is completed.

6.1 Sampling and Analysis of Containment Areas #1 and #2

Following removal of the zinc oxide material, the procedures outlined in CSD's Sampling and Analysis Plan dated October 10, 1996 will be followed except for the following:

> Sampling will be conducted using a skid loader and five foot stainless steel split spoon samplers. Each split spoon will be decontaminated between samples by washing with alconox , followed by steam cleaning, and finally a tap water rinse.

6.2 Sampling & Analysis of Remainder of Containment Area 4

A partial sampling of this area was conducted on October 23, 1996 and August 13, 1997. Samples were collected from locations CA4-1,CA4-2, CA4-3, CA4-4, CA4-5 and CA4-9 on October 25, 1996 for TCLP lead, cadmium and zinc. All samples were below the regulatory limit for hazardous waste. To determine clean up objectives additional samples were collected from the same locations in August of 1997 for total metal analysis of lead, cadmium and zinc. All sampling conducted to date indicates all samples are below the established clean up objectives. Refer to Section 4. 1 for a discussion of the clean up objectives. The remainder of the samples were not collected due to the presence of Containment Area #2 and contaminated stumps, wood, and limestone rock. The stumps, wood, and limestone rock have been removed, but Containment Area #4 was to wet in September 1997 to allow sampling to occur. In the event the area dries, samples CA4-5 and CA4-10 will be collected. The samples will be collected using the same procedures described in Section 6.1 for Containment Area #1.

6.3 Sampling and Analysis of the Ditch

After the excavation discussed in Section 5.4 is conducted, the ditch will be re-sampled. In accordance with Section 4.0, a grid interval of 50 feet will be established for confirmatory sampling. The samples will be collected using the same procedures described in Section 6.1 for Containment Area #1.

6.4 Sampling and Analysis of the Rock Road

After the excavation discussed in Section 5.5 is conducted, the rock road will be re-sampled. In accordance with Section 4.0, a grid interval of 50 feet will be established for confirmatory sampling. The samples will be collected using the same procedures described in Section 6.1 for Containment Area #1.

7.0 Groundwater Monitoring Plan

The purpose of this proposed Phase I groundwater investigation, is to determine the absence/presence of hazardous constituents in the shallow perched aquifer related to the zinc oxide spill. Well installation will confirm or deny the existence of the shallow perched aquifer encountered during previous investigations at the facility north and east of the spill site as well as the subsurface characteristics.

7.1 Regional Geologic and Hydrogeologic Information

The Chemetco site is located in the floodplain of the Mississippi River in an area locally referred to as the American Bottoms. This area is characterized by relatively flat topography. The gradient of the Mississippi River in the American Bottoms is about 6 inches per mile or 9.5×10^{-5}. The land surface gradient over a similar area is about 12 inches per mile or 6.3×10^{-5} both of these gradients are extremely flat.

Precipitation to the American Bottoms falls on the flat surface and either infiltrates into the ground or evaporates. Because of the flat surface there is very little runoff. Recharge to the groundwater system in this area is received from the highlands surrounding the American Bottoms, infiltration from channels, and Mississippi River flood waters. Infiltration of water into the ground is restricted by the clay and silt layer found near the surface. Beneath the clay and silt layer lies the regional American Bottoms sand and gravel aquifer which extends to bedrock. The source of some recharge may be the bedrock aquifer near pumping centers. Under non-pumping conditions the regional groundwater flow in the American Bottoms aquifer is expected to be toward the west or southwest towards the Mississippi River.

The regional aquifer is generally greater than 90 feet thick and extends to the bedrock. Although there is not distinct boundary between the formations in the regional aquifer, the regional aquifer is considered here to be comprised of two distinct hydrogeologic units given the gradation from silty sand to coarse sand and gravel. The clean sand and gravel deposits in the bottom zone of the American Bottoms aquifer constitute the major water-producing zone in the area. These deposits are utilized as groundwater supplies for municipal and industrial withdrawals, including Chemetco. Figure 7-1.1 shows the groundwater divides created by the major pumping centers in the area of the Chemetco site (Kohlhase, 1987). In 1951 these pumping centers produced a maximum withdrawal of 110 million gallons per day (mgd). In 1985 the withdrawal rate had declined to about 60 mgd (Kohlhase, 1987).

The Illinois State Water Survey (Water Survey) conducts periodic water-level monitoring programs of selected wells in the American Bottoms aquifer. Utilizing this water-level data the Water Survey produces a potentiometric map of the aquifer. This potentiometric map shows that aquifer withdrawals have significantly changed the groundwater flow direction within the aquifer and the flow is directed towards the various pumping centers. Using the potentiometric map, the Water Survey has determined the approximate locations of groundwater divides between the pumping centers. These divides, whose exact locations change according to variations in recharge and withdrawal rates, delineate the approximate areas of influence of the pumping centers.

Figure 7-1.1. shows the groundwater divides determined by the Water Survey (Kohlhase, 1987). This figure shows that the Chemetco site is on the edge of the area of influence of the Poag pumping center. The Chemetco site is also located just south of the areas of influence of the Roxana and Wood River pumping centers. The regional mapping does not have sufficient delineation of the groundwater contours in the Chemetco site area to determine the regional direction of groundwater flow. The flow in this area, however, should be towards the Mississippi River.

Because of the prolific production of the American Bottoms aquifer, the limestone aquifer below the American Bottoms aquifer has not been tapped for groundwater supplies. It is believed, that the limestone aquifer could also be a source for high capacity production wells; water sampling in other areas has shown that this bedrock aquifer is highly mineralized.

7.1.1. Description of Class I Groundwater

The American Bottoms Aquifer as described in Section 7.1. and 7.2. is a Class I Groundwater pursuant to Ill. Administrative. Code, Part 620.210.

7.1.2. Identification of Private/Potable Water Supply Wells

The Chemetco facility is located in a sparsely populated area. Consequently the number of withdrawal wells within a one (1) mile of the site is low. The only commercial/industrial are Chemetco's own wells. The well water is used for human consumption.

Well logs for ten (10) private wells within one (1) mile of the Chemetco facility were obtained from, State Agencies. Figure 7-1.2. indicates their locations in relation to the site. Several of the wells indicated in the figure are believed to be no longer in use.

Through field investigations to be conducted concurrent with other field sampling activities, Chemetco will verify which wells remain in service in the area.

7.1.4. Identification of Units Beneath the Site Subject to Class I Standards

The American Bottoms Aquifer is subject to Class I standards as is any hydraulically connected unit. Therefore, the shallow perched aquifer, if encountered beneath the spill area, may also be subject to Class I groundwater quality standards.

7.1.5. Identification of the Source of All Municipal Water

The regional aquifer is reportedly a drinking water source downgradient of Chemetco; Hartford municipal wells are reportedly northwest of the facility. In addition, potable water for the Chemetco facility is drawn from the two facility water supply wells, screened in the lower regional aquifer.

7.2 Characterization of Geology

As previously stated, the purpose of this proposed Phase I groundwater investigation, is to determine the absence/presence of hazardous constituents in the shallow perched aquifer related to the zinc oxide spill. At this time it can only be assumed that the hydrogeologic/geologic conditions discussed below can be correlated from previously studied areas at this facility to the area beneath the zinc oxide spill. Well installation will confirm or deny the existence, as well as the characteristics, of a shallow perched aquifer.

Chemetco has conducted interim-status groundwater monitoring for units north of the zinc oxide spill area since January 1983. During related investigations, it has been determined that the general hydrogeology of the site consists of an aquitard that contains lenses of water-bearing sand and silt underlain by the regional American Bottoms sand and gravel aquifer. A cross-section is included as Figure 7-2.1. The aquitard contains a perched sand aquifer that outcrops to surface south of the facility as depicted in Figure 7-2.2.

The Chemetco facility is underlain by a clay and silty clay unit ranging from approximately 20 to 60 feet in thickness. Interbedded within the clay in the southeastern quadrant of the facility is a sand lense (also referred to as the perched sand aquifer). The perched sand aquifer extends from 5 to 20 feet below grade with a maximum thickness of 15 feet and is bounded above and below by the clay and silty clay. The hydraulic conductivity of the perched unit has been calculated from slug test data to be 2.8×10^{-3} cm/sec. The results of site investigations indicate that the water flows from north to south across the southeastern quadrant of the facility. Data indicate the water-bearing formation does not extend to the facility northern and western boundaries and stops within 300 feet of the southern and eastern boundaries. A second sand and silt lense has been identified, based on water level elevations, to the east of well 12.

The clay layer averages 10 feet in thickness beneath the shallow perched zone and increases to 25 feet in thickness in the northern portions of the Chemetco facility (where the perched sand aquifer is not present). The hydraulic conductivity of the clay layer based on slug test data indicate a hydraulic conductivity of 4.6×10^{-5} cm/sec which is two or more orders of magnitude lower than the aquifers and therefore constitutes an aquitard.

Beneath the clay is a layer of fine to silty sand that grades to coarse sand with depth and finally to sand and gravel. This unit is the regional American Bottoms Aquifer. The regional aquifer is generally greater than 90 feet thick and extends to the bedrock. Although there is not distinct boundary between the formations in the regional aquifer, the regional aquifer is considered here to be comprised of two distinct hydrogeologic units given the gradation from silty sand to coarse sand and gravel. The hydraulic conductivity of the upper regional zone determined by slug tests and pumping tests is 1×10^{-2} cm/sec. The hydraulic conductivity of the lower zone of the regional aquifer determined by pumping tests is 1×10^{-1} cm/sec. Regional groundwater flows under non pumping conditions towards the Mississippi River.

Chemetco will attempt to gather the following information during installation of the proposed well system specific to the area beneath the spill:

- A qualitative assessment of porosity, texture, uniformity, lithology of all significant units

- Significant structural features

- Stratigraphic contacts between significant formations/strata

- Zones of high permeability, fracture or channeling in consolidated and unconsolidated deposits

- Perched aquifers

- Location of borehole, depth of termination

- Zone of saturation/thickness of the unit

- Interpretations of hydraulic connections between saturated zones

7.3 Proposed Monitoring Well System

A monitoring well system is proposed herein which is intended to yield representative groundwater samples from shallow groundwater beneath the Chemetco facility. Again, the purpose of this groundwater investigation is to determine whether shallow groundwater has been impacted by the zinc oxide spill undergoing clean-up.

7.3.1. Well Location and Screens

Based on data measurements collected during investigations conducted at Chemetco, flow in the shallow perched aquifer is thought to move predominately from north to south across the southeastern quadrant of the facility. Quarterly potentiometric maps for 1996, Figures 7-3.1. through 7-3.4., are included for reference. Therefore, Chemetco is anticipating a similar flow regime in the vicinity of the zinc oxide spill area. Chemetco proposes to install one upgradient well north of Containment area #1 as depicted in Figure 7-3.5. Three downgradient wells are proposed along a primarily east-west traverse just south of Long Lake and the temporary diversion channel south of Containment Area #3 also as depicted in Figure 7-3.5. All wells will be screened at similar depths. Total depth of wells should not exceed 25 feet below ground surface (BGS). If no substantial sand lenses are encountered during drilling activities, the screens shall be set at the first water-bearing zone as encountered in the field. Hydraulic conductivity testing shall be performed in the field on all four wells.

7.3.2. Drilling Operations

Wells will be installed using a 4 1/4" hollow stem auger. There will be no addition of fluids or drilling muds. All drill cuttings will be containerized and disposed of properly.

7.3.3. Construction, Development, and Maintenance of Wells

All wells shall be constructed pursuant to Ill. Admin. Code, Part 920 of the Illinois Water Well Construction Code and the Well Construction Diagram included as Figure 7.3.6. All borings shall be continuously sampled using five foot split spoon samplers. A typical boring log and well completion report is included as Figures 7-3.7. and 7-3.8. Wells shall be constructed of the following materials:

- Well screens and risers shall be constructed of schedule 40 PVC, ASTM 2 pitch threads, 2 inch inside diameter;

- The screens shall be either 2 in/4 in Monoflex U-pack well screen, 0.010 inch slot size, ten feet in length and prepacked with 20/40 grade silica sand; or, a 2 in, 0.010 inch slot size, ten feet in length schedule 40 PVC well screen;

- If a pre-packed screen is not utilized, an artificial filter pack shall be placed in the annular space between the borehole wall and the screen. The filter pack material shall be chemically inert and installed in a manner that prevents bridging and particle-size segregation. At least two inches of filter pack material should be installed between the well screen and the borehole wall.

- Casing and screen material are to be decontaminated prior to installation to remove any coatings or manufacturing residues. Decontamination includes a wash with a mild non-phosphate detergent/potable water solution and a rinse with potable water;

- Silica sand (20/40 grade) will be used to extend the filter pack to a length no greater than two feet above the top of the screen;

- A minimum of two feet of bentonite, either granular, pellets, or chips shall be placed around the casing by means of prehydrating at the surface and pumping through a tremie pipe. The bentonite seal is to be allowed to completely hydrate, set or cure in conformance with the manufacturer's specification prior to installing the grout seal in the annular seal;

- The annular space above the bentonite seal is to be filled with a neat cement containing bentonite from 2% to 6% by weight or a combination thereof;

- Wells will be constructed with a 4' by 4' concrete pad with (4) 6" steel bumper posts placed on the corners of the pad; and,

- Wells will be constructed with lockable steel well covers.

All wells shall be properly developed to ensure the collection of representative groundwater samples. All water removed from the wells shall be containerized until analyses are received from the lab, at which time it shall be disposed of appropriately.

The integrity and condition of each well shall be inspected quarterly during sampling activities. This shall be noted in the field notebook and sample collection record form. Any activities related to well maintenance shall also be recorded in the aforementioned records.

7.3.4. Protection and Identification of Wells

Wells will be protected from damage by constructing a 4' x 4' concrete pad with (4) 6" steel bumper posts on the corners of the pad. Lockable steel well covers, 4" x 5' in size, shall be also be utilized.

All wells shall be surveyed to determine their location as well as their distances from the spill area and their distance from each other. These locations shall be surveyed by a licensed professional surveyor (or equivalent) within +/-0.01 foot in relation to mean sea level, which in turn is established by reference to an established National Geodetic Vertical Datum. The surveyed reference mark shall be clearly and permanently marked on top of the inner well casing.

The well identification numbers, monitor point number, shall be clearly and permanently marked on the outside of the protective cover.

7.3.5. Well Replacement

A monitoring well will be replaced if it is damaged, if it does not consistently produce a sample, or if there are problems attributable to well construction. If a well is replaced, all conditions specified in Attachment E to the DRAFT IEPA RCRA Closure Guidance Document dated November 1994 as well as Ill. Admin. Code Part 920 will be followed.

7.3.6. Well Plugging and Abandonment Procedures

At such time a well must be plugged or abandoned, the Agency shall be notified and such activities shall be executed in accordance with 77 Ill. Admin. Code 920.120 (b) (7) by grouting from the bottom up with a tremie pipe using neat cement containing bentonite from 2% to 6% by weight or combination thereof. This material shall be applied the full depth of the well and terminate within three feet of the ground surface. Final three feet shall be filled with premix concrete to the surface. Monitor Well Reports shall be submitted to the Illinois Department of Public Health within 30 days after monitor wells have been completed on forms as are prescribed and furnished by the Department. Boring logs and monitor well completion reports shall be submitted as part of the report of findings for this Phase I investigation.

7.4. Sampling and Analysis Plan

Please refer to Attachment 10 which contains the Sampling and Analysis Plan.

7.5. Parameters

Since the groundwater monitoring proposed herein pertains to the zinc oxide spill, Chemetco is proposing to sample shallow groundwater for indicator parameters, the eight RCRA metals, and zinc as listed below:

- pH;
- Specific Conductance;
- TOX;
- TOC;
- Lead;
- Cadmium;
- Zinc;
- Arsenic;
- Barium;
- Silver:
- Mercury;
- Selenium; and,
- Chromium.

If any of the aforementioned constituents are present above the applicable Ill. Admin. Code Part 620 groundwater quality standards, confirmation sampling shall be initiated. If additional sampling confirms elevated concentrations, Chemetco will propose a Phase II investigation.

7.6. Conclusion

The purpose of the Phase I groundwater investigation contained in Section 7 is to determine the presence/absence of hazardous constituents in shallow groundwater related to the zinc oxide spill. Subsurface borings, a properly constructed monitoring well system and water quality analyses will allow such a determination.

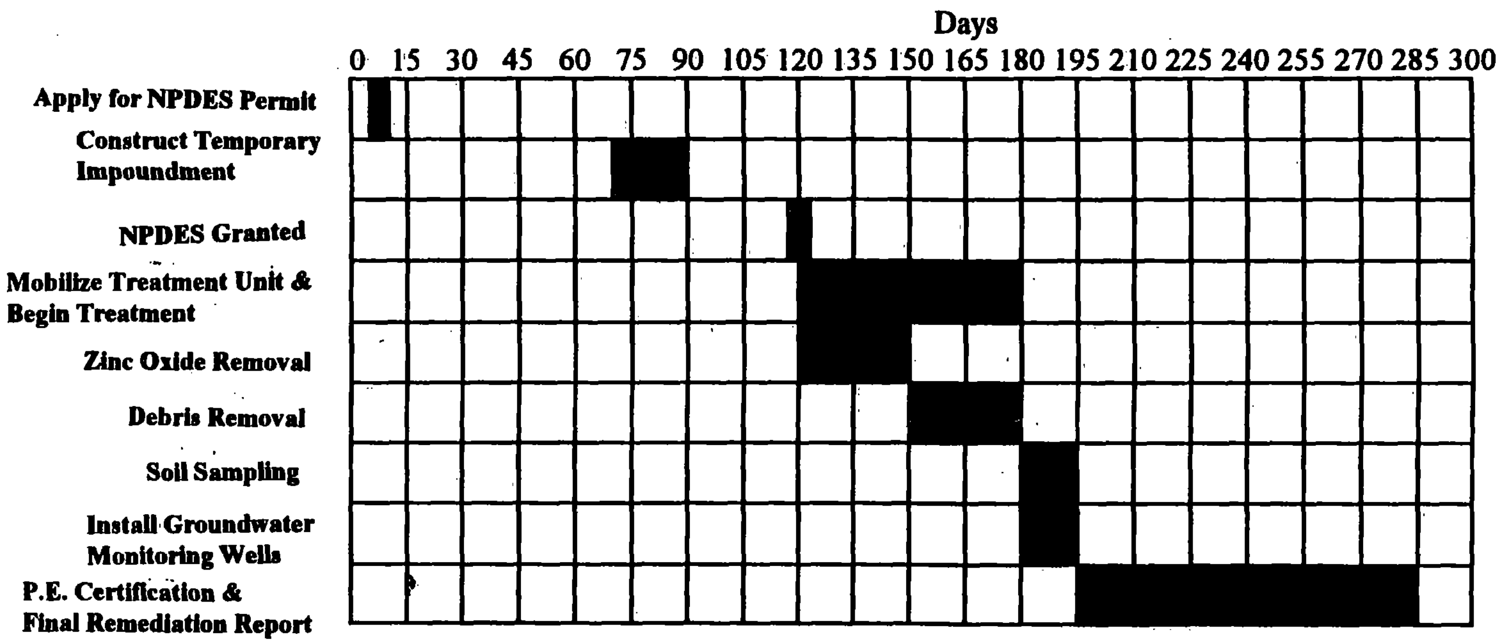
A Phase I Report shall be prepared by Chemetco to be submitted to the Agency and at a minimum will include the following information:

- Boring logs;
- Well completion reports;
- A description of the geology/hydrogeology in the vicinity of the zinc oxide spill;
- Two scaled geologic cross-sections with the interval over which the wells are screened clearly marked;
- An appropriately scaled map which shows the locations of borings, surface features, property boundaries, roads, spill area, etc.;
- Results of water quality analyses;

- Results of any hydraulic conductivity testing; and,
- Determination of groundwater class pursuant to 35 Ill. Admin. Code Part 620.

At such time as the results from the Phase I investigation indicate that further action related to groundwater is necessary, Chemetco shall propose additional investigation including a Phase II and/or Phase III investigation, as appropriate.

TABLE 8.1
REMEDIATION SCHEDULE
CHEMETCO, INC.



FIGURES.

FIGURE 2-1

Location Map - Chemetco